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ORIGINAL

FLOOD INSURANCE STUDY

BONNER COUNTY, IDAHO
UNINCORPORATED AREAS

FEBRUARY 1, 1984
REVISED
AUGUST 4, 1987

Federal Emergency Management Agency

COMMUNITY NUMBER - 160206

51/09

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

This publication incorporates revisions to the original FIS. These revisions are presented in Section 9.0.

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PUBLISHED SEPARATELY

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FLOOD INSURANCE STUDY

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the unincorporated areas of Bonner County, Idaho, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to convert Bonner County to the regular program of flood insurance by the Federal Emergency Management Agency. Local and regional planners will use this study in their efforts to promote sound flood plain management.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these federally supported studies are based. These criteria take precedence over the minimum Federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 24 CFR, 1910.1(d). In such cases, however, it shall be understood that the State (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgments

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968, as amended.

The hydrologic and hydraulic analyses for this study were performed by CH2M HILL, for the Federal Emergency Management Agency, under Contract No. R-4591. This work, which was completed in July 1980, covered all significant flooding sources affecting the unincorporated areas of Bonner County.

1.3 Coordination

A meeting attended by Bonner County officials and representatives of the Federal Emergency Management Agency and the study contractor was held in July 1977 to identify streams to be studied by detailed and approximate methods. At an intermediate coordination meeting held in April 1980, Bonner County officials requested an additional detailed study for reaches of Clark Fork, Pack, and Priest Rivers.

Contacts by the study contractor were made throughout the study period with Bonner County officials, the U.S. Army Corps of Engineers, the U.S. Geological Survey, the U.S. Soil Conservation Service, the State of Idaho Department of Water Resources, and the Washington Water Power Company to solicit all known flood-related data that had been collected by these agencies.

Personal interviews with county residents were also made in order to maintain flood history and flow information. This information was used to define flood patterns and flooded areas more accurately.

Close contact was kept with the U.S. Army Corps of Engineers, Seattle District, Seattle, Washington, to coordinate hydrologic and hydraulic data on Pack River and Lake Pend Oreille.

Coordination with the Federal Emergency Management Agency was maintained by the study contractor in order to resolve study procedure and methodology for the lake analyses.

The final coordination meeting was held on January 20, 1983, and was attended by representatives of the Federal Emergency Management Agency, the study contractor, and the county. No problems were raised at the meeting.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the unincorporated areas of Bonner County, Idaho. The area of study is shown on the Vicinity Map (Figure 1).

Several small incorporated cities, not all of which are included in this study, lie within the boundaries of Bonner County. The limits of detailed and approximate studies in Bonner County were determined by the Federal Emergency Management Agency with county and study contractor personnel consultation. Those areas studied by detailed methods were chosen with consideration given to all proposed construction and forecasted development through 1985.

The following is a list of detailed study areas:

1. Clark Fork, from Lake Pend Oreille upstream to approximately 2,000 feet downstream from Cabinet Gorge Dam
2. Grouse Creek, from its confluence with Pack River upstream to the second road crossing
3. Lightning Creek, from its confluence with the corporate limits of the City of Clark Fork upstream to approximately 500 feet below the national forest boundary
4. Mosquito Creek, from its confluence with Clark Fork upstream to the City of Clark Fork corporate limits
5. Pack River, from State Route 200 upstream to the Boundary-Bonner County line

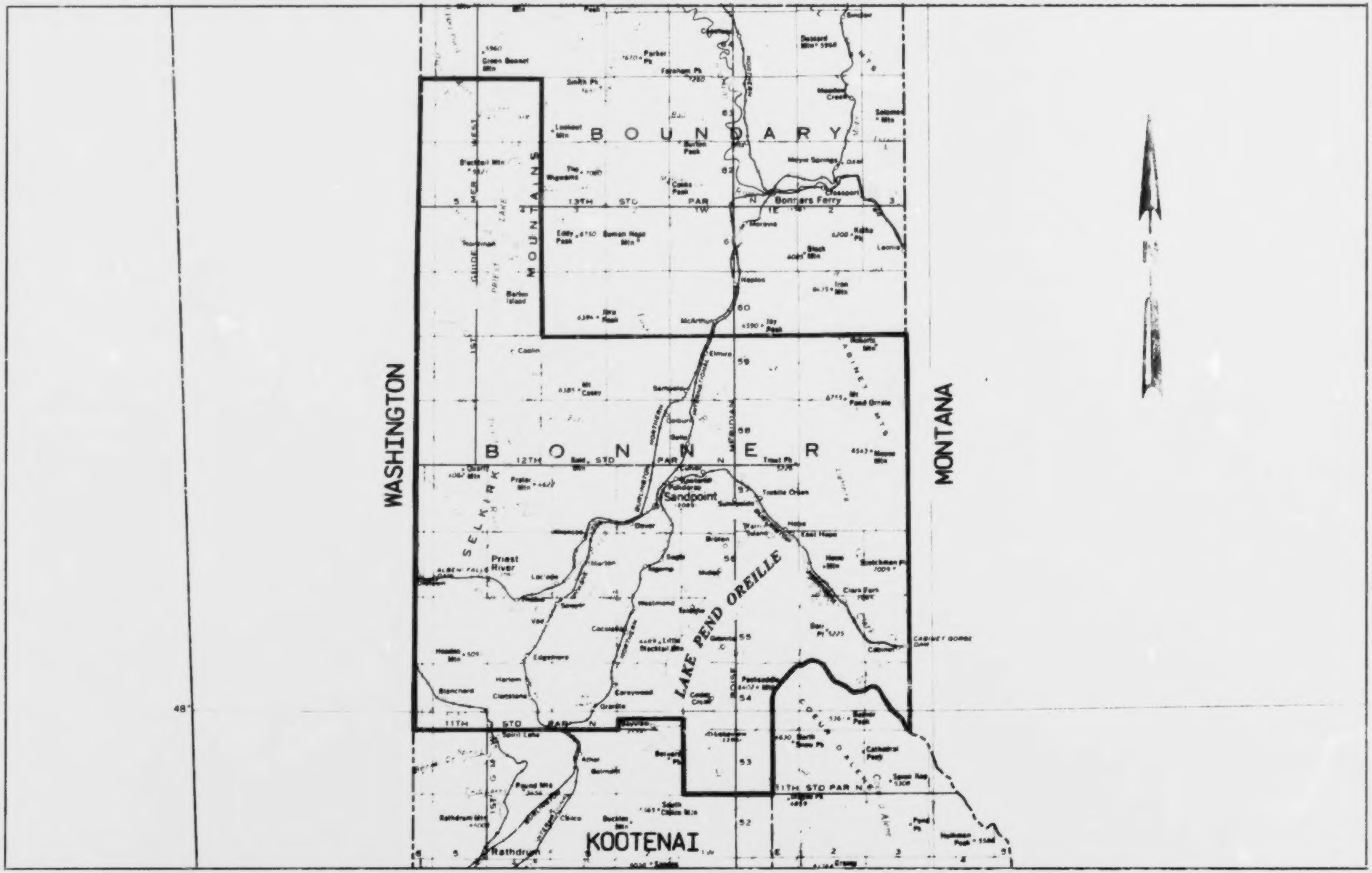

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

APPROXIMATE SCALE

0 24 36 MILES

VICINITY MAP

6. Priest River, from its confluence with Pend Oreille River upstream 17,000 feet to the U.S. Geological Survey gaging station near the confluence with the Lower West Branch Priest River; from the center of Section 29, T57N, R4W, approximately 1.75 miles southeast of McAbee Falls, upstream to the confluence of Quartz Creek; and from the midpoint on Section Line 27/28, T58N, R4W, just downstream from the confluence with East River, upstream to the confluence with the Upper West Branch Priest River

7. Rapid Lightning Creek, from its confluence with Pack River upstream to a bridge crossing approximately 0.25 mile above the confluence with Flume Creek

8. Sand Creek North, a tributary of Pack River, from its confluence with Pack River upstream to its second bridge crossing

9. Sand Creek, a tributary of Lake Pend Oreille at Sandpoint, from its confluence with Lake Pend Oreille upstream to the Burlington Northern Railroad crossing just above the confluence with Jack Creek

10. Spring Creek, from its confluence with Lightning Creek upstream to approximately 2,300 feet below the national forest boundary

11. Lake Pend Oreille, from Albeni Falls Dam to the mouths of North Fork, Middle Fork, South Fork, and Clark Fork

12. Lake Cocolalla

13. Lake Kelso

Approximate analyses were used to study those areas having a low-development potential or minimal flood hazards.

The following areas are included in approximate study:

1. Berry Creek, from its confluence with Colburn Creek upstream to the national forest boundary

2. Blanchard Creek, from the Idaho-Washington State line upstream to Blanchard Lake

3. Bodie Canyon, from its confluence with Pend Oreille River upstream to the national forest boundary

4. Colburn Creek, from its confluence with Pack River upstream to the confluence with Section 2, T. 58 N., R. 2 W.

5. Careywood Creek, from Section 18, T. 54 N., R. 2 W., upstream to Section 19, T. 54 N., R. 2 W.

6. Caribou Creek, from its confluence with Pack River upstream to the national forest boundary

7. Cocolalla Creek, from its confluence with Lake Pend Oreille upstream to a road crossing at Section 21, T. 55 N., R. 2 W.

8. Dry Creek, from its confluence with Twin Creek upstream to Section 4, T. 54 N., R. 3 E.

9. Dubius Creek, from its confluence with Priest River upstream to U.S. Highway 57

10. East River, from its confluence with Priest River upstream to its confluence with Middle Fork East River

11. Fish Creek, from its confluence with Cocolalla Creek upstream to the national forest boundary

12. Flume Creek, from its confluence with Rapid Lightning Creek upstream for approximately 1 mile

13. Gold Creek, from its confluence with Pack River upstream to its first bridge crossing, approximately 1 mile upstream from Gold Creek School

14. Goose Creek, from its confluence with upper West Branch Priest River to Section 29, T. 59 N., R. 5 W.

15. Grouse Creek, from the limit of detailed study upstream to its confluence with North Fork

16. Hoodoo Creek, from its confluence with Pend Oreille River upstream to a point in the N 1/2 Section 20, T. 54 N., R. 3 W.

17. Little Sand Creek, from its confluence with Sand Creek upstream for a distance of approximately 3 miles

18. Lower West Branch Priest River, from its confluence with Priest River upstream to the Idaho-Washington State line

19. Middle Fork East River, from its confluence with East River upstream to Section 18, T. 58 N., R. 3 W.

20. Moores Creek, from its confluence with Lower West Branch Priest River upstream to its confluence with West Fork Moores Creek

21. Poirier Creek, from Blanchard Lake upstream to the Bonner County-Kootenai County limits

22. Pend Oreille River, from the Idaho-Washington State line upstream to Albeni Falls Dam

23. Priest River, from the limit of detailed study area near the City of Priest River to the center of section 29, T.57 N., R.4 W., approximately 1.75 miles southeast of McAbee Falls; from its confluence with Quartz Creek to the midpoint on Section Line 27/28, T.58 N., R.4 W.; from the confluence with the Upper West Branch Priest River to Priest Lake

24. Quartz Creek, from its confluence with Priest River upstream to Section 26, T. 58 N., R. 5 W.

25. Rapid Lightning Creek, from the limit of detailed study upstream to the intersection of Section 5, T. 31 N., R. 2 E.

26. Riley Creek, from its confluence with Pend Oreille River upstream to Section 36, T. 57 N., R. 4 W.

27. Riser Creek, from its confluence with Lake Pend Oreille to the national forest boundary

28. Sagle Creek, from its confluence with Lake Pend Oreille upstream to Shepherd Lake

29. Sand Creek, from the limit of detailed study upstream to the national forest boundary

30. Snow Creek, from its confluence with Lower West Branch Priest River upstream to Section 29, T. 57 N., R. 5 W.

31. Spirit Creek, from a point near the middle of Section 23, T. 54 N., R. 5 W., upstream to the Bonner County-Kootenai County limits

32. Strong Creek, from its confluence with Lake Pend Oreille to the national forest boundary

33. Syringa Creek, from its confluence with Lake Pend Oreille upstream to the sixth bridge crossing

34. Trapper Creek, from its confluence with Rapid Lightning Creek upstream to the national forest boundary

35. Trestle Creek, from its confluence with Lake Pend Oreille upstream for approximately 1.5 miles

36. Trout Creek, from its confluence with Pack River upstream to the national forest boundary

37. Tunnel Creek, from its confluence with Lower West Branch Priest River upstream to Section 18, T. 57 N., R. 5 W.

38. Turnipseed Creek, from its confluence with Syringa Creek upstream to the second bridge crossing

39. Twin Creek, from its confluence with Clark Fork upstream to the national forest boundary

40. Unnamed tributary to Tunnel Creek, from its confluence with Tunnel Creek to Section 18, T. 57 N., R. 5 W.

41. Unnamed tributary to Clark Fork near the Montana-Idaho State line for approximately 1.5 miles

42. Unnamed tributary to Snow Creek, from its confluence with Snow Creek upstream to Section 19, T. 57 N., R. 5 W.

43. Unnamed tributary to Bodie Canyon, from its confluence with Bodie Canyon upstream to the national forest boundary

44. Upper West Branch Priest River, from its confluence with Priest River to the Idaho-Washington State line

45. Valley Creek, from its confluence with Snow Creek upstream to Section 19, T. 57 N., R. 5 W.

46. Priest Lake

2.2 Community Description

Bonner County is located in the northern Idaho Panhandle approximately 35 miles south of the Canadian border. It is bordered on the east by the State of Montana, on the west by the State of Washington, on the north by Boundary County, and on the south by Kootenai and Shoshone Counties, Idaho. Spokane, Washington, is approximately 50 miles southwest of the county seat of Sandpoint.

Sandpoint is the largest city and had a population of 3,895 in 1976. The county population was 17,671 in 1975. Other than Sandpoint, the principal communities are Clark Fork with a population of 418; Priest River, 1,531; Kootenai, 191; and Ponderay, 313 (Reference 1).

Lumbering, tourism and recreation, and agriculture are the major industries of the county (Reference 1). Eighty-eight percent of the Panhandle land is forested, and approximately 6 percent is cropland. Less than 10 percent of the cropland is irrigated, nearly all of it on the Rathdrum Prairie which straddles the Bonner-Kootenai County limits. The remainder consists of nonforested rangeland, urban and industrial areas, roads, and barren lands (Reference 2).

The Panhandle contains approximately 4.6 million acres of land of which more than 80 percent is commercial forest. Small private holdings constitute 26 percent of these forested lands, with industry, State, and Federal government holdings being approximately 15, 8, and 51 percent, respectively. The volume of commercial timber is 34,644 billion board feet, 25 percent of the State's total. The average annual harvest is 876.5 million board feet, or 2.5 percent of the total stand volume. Bonner County contributes 23 percent of these Panhandle five-county totals; average annual employment in the county forest products industry is 1,171 persons.

Of a total Bonner County acreage of approximately 1.2 million acres, 53,690 acres are dry cropland, 470 acres are surface-irrigated cropland, and 1,840 acres are sprinkler-irrigated cropland (Reference 1). Forage is the principal agricultural product.

Most recreational areas are adjacent to or closely associated with streams, lakes, or rivers; the Kaniksu National Forest provides a natural setting for many leisure activities. Priest Lake is surrounded by dense stands of pine, fir, and cedar. The 37-square-mile lake is the site of several privately owned resorts, numerous summer homes, and nearly 200 improved public camping units.

Lake Pend Oreille is Idaho's largest lake, with a surface area of 148 square miles and a measured depth of 1,200 feet. The 4,500-acre Farragut State Park is at the southern end of the lake. The park has 60 overnight camping sites with central water and sewage facilities and 150 less-improved campsites (Reference 3).

The major topographic features in this region are the alluvium-filled valleys, which make up the lowlands, and the bordering mountainous highlands. The topographic break between the highlands and lowlands is generally abrupt. The rugged relief and well-established drainage systems that characterize the mountainous terrain of the highlands are the result of differential erosion of the bedrock. The lowlands have a flat to rolling topography and, because of the permeable composition of the underlying material, have no established surface drainage. Most of the smaller streams flowing off the highlands onto the lowlands disappear in a short distance; little if any surface runoff is generated in the lowlands (Reference 4).

The Northern Rathdrum Prairie lies within the southwestern border and contains the most heavily concentrated irrigated agricultural development (Reference 2). It overlies a highly permeable aquifer of sand, gravel, and boulders. Estimates of underflow indicate that approximately 200 to 300 million gallons per day (mgd) move toward the prairie, including an estimated 30 to 130 mgd from Lake Pend Oreille (Reference 4).

Temperatures in the Panhandle closely follow the seasons. January is the coolest month and July is the warmest. Valleys in the vicinity of Sandpoint experience the warmest climate. Summer temperatures throughout the Panhandle are generally cooler than most other areas in the state, although the area has a relatively long growing season. Temperature records for the Bonner County area show the average frost-free season to exceed 150 days (Reference 4).

The Panhandle contains the most abundant water resources in Idaho. Precipitation and runoff, on a unit basis, are generally greater than anywhere else in the state. Mean annual precipitation ranges from approximately 20 inches on Rathdrum Prairie to more than 60 inches in the mountain areas, and occurs principally between October and June. Most of this precipitation is in the form of snow at the higher elevations, although rainstorms can occur at all elevations in the winter. The largest floods have been in December and January when warm rains have fallen on melting snow (Reference 5).

The Clark Fork-Pend Oreille River basin is the major river basin in the county. Clark Fork, which drains most of western Montana, carries approximately 15.8 million acre-feet per year at Cabinet, its point of entry into Idaho. It flows into Lake Pend Oreille; when it leaves Idaho as the Pend Oreille River below Albeni Falls Dam, mean annual flow increases to 18.5 million acre-feet (Reference 2).

Another major waterway is the Priest River system, which drains the Selkirk Mountains (elevations to 7,300 feet). It flows into and out of Priest Lake and joins Pend Oreille River at the City of Priest River (Reference 2).

Pack River originates in the forested Selkirk Mountains and flows southeasterly into Lake Pend Oreille approximately 10 miles east of Sandpoint. Pack River drains approximately 300 square miles, more than one-half from streams draining westerly from the western slopes of the Cabinet Mountains (Reference 5).

The most significant water resource development projects in the Panhandle were built for hydroelectric power. The largest plants are at Cabinet Gorge, Washington Water Power Company, 200,000 kilowatts; and Albeni Falls, U.S. Army Corps of Engineers, 42,600 kilowatts (Reference 2). Priest Lake is controlled by a small dam for recreation in the summer. Following the recreation season, the stored water is released for downstream power. The dam is operated by Washington Power Company under an agreement with the State of Idaho, owner of the dam (Reference 3).

Smaller lakes are prevalent throughout Bonner County. As many people desire to live beside or near bodies of water, development has taken place in these areas. In times of severe runoff volume created by heavy snowmelt augmented by rainfall, these lakes have flooding potential for some residences. Development in these areas is expected to increase at a rapid pace.

2.3 Principal Flood Problems

Bonner County is susceptible to periodic flooding along the streams due to overflow, particularly during rapid spring snowmelt. The flood season generally begins in April, peaks in May or June, and subsides in July. Intermittent flooding often occurs after hot weather or heavy rains, but snowmelt runoff is generally slow and steady (Reference 5).

Major river drainages are the Priest and Clark Fork-Pend Oreille River basins. Pack River is a tributary of Clark Fork-Pend Oreille River. Both major basins contain large lakes: Priest Lake and Pend Oreille Lake.

Priest Lake water levels are controlled and operated for hydropower generation; however, there is no flood-control space allocated in the natural lake (Reference 2). Lake Pend Oreille has been controlled by Albeni Falls Dam near Newport since 1952. Major flood damages around the lake in an 18-year frequency flood average $67,000. Damage occurs to 20,350 acres at the Clark Fork Delta, Pack River Delta, Oden Bay, Sandpoint, and Morton (Reference 3).

The lowlands along Clark Fork-Pend Oreille River have flooded in 1894, 1933, 1948, 1956, 1969, and 1974 in Bonner County. The highest flooding occurred in 1894 with damages estimated at $6.8 million, 1967 prices and development; discharge measured at the state line at Newport, Washington, was 200,000 cubic feet per second (cfs). In June 1948, discharge was 162,000 cfs, and levees were overtopped. Sandpoint received excessive damage in the 1974 flooding. Damage in previous flooding has been largely sustained by grain crops and pastureland, with some low-lying roads and buildings affected around the lakes (Reference 3).

In the Pack River basin, streamflow is measured 10 miles north of Sandpoint. Average recorded discharge is 330 cfs, with a maximum discharge of 4,370 cfs on May 30, 1969. In this flood, the peak flow resulted from heavy rains, which, in turn, caused a sudden surge in the river, already high from snowmelt runoff. A newspaper account reported a cloudburst rain in Bonner County which washed out the Pack River road above Hellroaring Creek. Pack River cut a new channel around the upper bridge during the 1969 flood.

The 100-year frequency floods along Pack River are predicted as 8,500 cfs near Colburn; 15,500 cfs above Rapid Lightning Creek; 18,750 cfs below Rapid Lightning Creek; and 19,500 cfs at the State Route 200 bridge.

In 1974, area newspapers reported the January flooding occurring near Sandpoint. Of the schools in Bonner County School District, 82 were closed, and the governor proclaimed five northern Idaho counties to be disaster areas, including Bonner County:

> . . . flooding continued throughout Bonner County today forcing several road closures and evacuation, however, no injuries were reported. . . Residents in the Pack River flats area of Rapid Lightning Creek were forced to evacuate.
>
> Local authorities had expressed concern yesterday that the city's water reservoir dam would give way. . . Five men worked for over two hours removing ice from the dam yesterday, (according to Jack Lekner, superintendent of public works). . . An eight-inch water main that runs across Sand Creek on Popcycle Road was washed out.
>
> In Sandpoint, water has caused excessive damage to several streets, Leckner stated, all of which will require repair work when the water recedes. (Reference 6)

The next day, the newspaper reported:

> Two feet of water was running over the dam in Strong Creek today, Phillips said. . .
>
> Other reports received by the Sheriff's Office as of early today are:
>
> - Highway 200 at Laclede closed.
> - Talache Road washed out and closed. Travel to Priest River via Dufort.
> - Baldy Road, washouts.
> - Pleasant View Road, washouts.
> - Dufort Road, closed to all truck traffic.
> - Colburn water works is out.
> - Bottle Bay Road washed out.
> - Cocolalla Lake is up to eight inches.
> - The old city pier just east of here is also partially washed away. (Reference 6)

In another newspaper on the same day, high water, icy road conditions, and continuance of school closures were reported:

> The level of Lake Pend Oreille was predicted to rise during the next several days to about elevation 2056. . . Inflow was up to 27,000 cubic second feet Monday with the possibility of inflow may reach as high as 50,000 cfs before the end of the week. . .
>
> The sheriff's department reported Tuesday that floodwaters on Rapid Lightning Creek has completely destroyed one

> home and damaged the front porch and garage of a second dwelling. . .
>
> A portion of the U.S. 95 between Sandpoint and Colburn was covered by more than two feet of water, with almost one-third of the highway washed away. The east end of the Bronx cutoff was completely washed away by a rampaging Sand Creek. . .
>
> The Pack River Road was reportedly completely washed out above Edna's Tavern. . . (Reference 7)

The storm continued, and on January 18, 1974, State and Federal action was reported in the area. The Governor sought national disaster status and the U.S. Army Corps of Engineers allowed additional storage in Lake Pend Oreille:

> The Corps of Engineers announced today water will be stored in Pend Oreille Lake above the normal maximum winter level of elevation 2,060 feet above sea level. . . it will probably go another two feet.
>
> Officials there are making preparations now to spill water if that becomes necessary. . . . (Reference 6)

By January 22, newspaper reports began estimating damage and telling of flood victims:

> Returning to the most awful mess imaginable. . .
>
> Estimates released last week indicate that at least $3 million in damage was done to county roads during the flooding. The City of Sandpoint has estimated its damage at nearly $60,000. (Reference 6)

2.4 Flood Protection Measures

Major impoundment structures exist on Lake Pend Oreille at Albeni Falls Dam and Clark Fork at Cabinet Gorge Dam. These structures are mainly used for power production purposes. They also enable Albeni Falls Dam to control the annual minimum lake level to an elevation higher than would be experienced under natural conditions and to reduce the maximum lake level for floods with peaks between 80,000 and 220,000 cfs.

Lake levels are also affected by regulation of the upstream reservoir on South Fork Flathead River at Hungry Horse and by storage in Flathead Lake, both in Montana.

For recreation purposes, the elevation of Priest Lake is controlled by a small dam during the summer. Water is later released for downstream power. During high flow conditions, the control for lake outlet passes from this dam to natural backwater from the river channel leaving the lake.

A levee was constructed in 1959 by the U.S. Army Corps of Engineers on the east bank of Lightning Creek from its mouth to approximately 2 miles upstream. This levee offers protection from a 100-year flood event.

Nonstructural measures of flood protection are also being used to aid in the prevention of future flood damage. These are in the form of land-use regulations adopted from the Code of Federal regulations which control building within areas that have a high risk of flooding (Reference 8).

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the county, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual occurrence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported here reflect flooding potentials based on conditions existing in the county at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for floods of the selected recurrence intervals for each flooding source studied in detail affecting the county.

A regionalized frequency analysis was conducted on annual peak-flow data obtained from 11 stream-gaging stations located throughout northern Idaho. The gages range in drainage area from 1.1 to 1,220 square miles, with length of record ranging from 9 to 55 years (References 4, 9, 10, 11, and 12). A log-Pearson Type III frequency analysis was made on these known discharges using procedures as outlined by the U.S. Water Resources Council (Reference 13). Historical accounts of flooding and the actual computed gage skews indicated that the generalized skew coefficient (Reference 13) of -0.30 was too low for application in this region. Computed gage skews were used with additional consideration given to length of gage record and drainage basin characteristics.

With values from the above analyses, unit runoff versus drainage area curves were developed. These curves were used for estimating peak flow values for Grouse Creek, Lightning Creek, Mosquito Creek, Pack River, Rapid Lightning Creek, Sand Creek, Sand Creek North, and Spring Creek.

Gaging stations on Clark Fork and Priest River were the primary source of information used for defining peak discharge-frequency relationships for the rivers. The gages have been in continuous operation since 1928 and 1929, respectively (References 9, 10, 11, and 12).

Peak discharges for the required recurrence intervals were obtained from a log-Pearson Type III frequency analysis of annual peak flow data adjusted as described using "Guidelines for Determining Flood Flow Frequency" (Reference 13).

Due to the regulation of Priest River flows by Priest Lake and unique runoff characteristics of Priest River, several methods of analyses were utilized in calculating flows in the two upstream detailed study areas. A log-Pearson Type III frequency analysis was conducted on all known existing flow records for four stream gages located in the Priest River drainage area. The drainage areas vary from 10 to 966 square miles, with length of records from 18 to 50 years. With this data, the timing of peak flows and producing areas for peak flows were analyzed and found to correlate for the drainage area above Coolin (drainage area 624 square miles) and gage for Priest River at Priest River (drainage area 966 square miles). Peak flows for the required specific frequency floods were determined at the study reaches by a unit runoff basis combined with values from the frequency analyses for the gage located on Priest River at Coolin.

For Mosquito Creek downstream of the Burlington Northern Railroad, peak flows were reduced due to hydrograph routing caused by the large railroad embankment and small culvert opening. Inflow hydrographs used for routing calculations for the 10-, 50-, 100-, and 500-year floods were obtained from procedures as outlined for lake analyses. The U.S. Army Corps of Engineers HEC-I computer program was used for all routing calculations (Reference 14). Backwater from the Burlington Northern Railroad is shown on the water-surface profiles. These water-surface elevations were taken from the routing calculations and used in the HEC-2 backwater analyses (Section 3.2).

Peak discharge-drainage area relationships for each stream studied in detail are shown in Table 1.

The Pend Oreille Lake stage-frequency curve was determined by a graphical frequency analysis of maximum annual lake stages plotted on an arithmetic probability grid with median plotting positions.

Inflow-outflow routing calculations were used to define peak elevation data for the 10- and 100-year floods on Cocolalla and Kelso Lakes. Inflow hydrographs for these calculations were taken from recorded high-water events on nearby gaging stations. Several hydrographs from various recorded floods were analyzed for unit volume of runoff, instantaneous peak flow, and shape.

Statistically, during the January 1974 flood, several of the stations analyzed recorded 100-year peak flows. After the analysis of unit runoff, it was assumed the volume associated with these peaks was also a 100-year event.

The analysis of hydrograph shape revealed the most valid hydrograph to use in routing calculations for the 100-year flood came from the gage on Coeur d'Alene River located near Prichard. The recorded 1974 hydrograph was linearly adjusted to reflect drainage area differences between each lake studied and Coeur d'Alene River at Prichard drainage area. Instantaneous peak flows for each hydrograph were taken from the regional curve developed for the various drainage areas studied by detailed methods.

The hydrograph for routing calculations to determine the 10-year event was taken from the March 1950 flood recorded on Hayden Creek. This flood produced statistically a 10-year peak for the gage located below North Fork Hayden Creek near Hayden Lake. Hydrographs were again adjusted linearly to reflect drainage area differences, and the 10-year peak flow for each hydrograph was taken from the regional curve.

The HEC-1 computer program Flood Hydrograph Package was used for all calculations of inflow-outflow parameters (Reference 14).

Starting lake elevations used in the HEC-1 routing calculations were based on information obtained during field reconnaissance and interviews with local residents in the area. Computed 100-year lake elevations were checked for reasonableness with high-water marks obtained during the 1974 flood. Elevations for floods of the selected recurrence intervals on all lakes studied by detailed methods are shown in Table 2.

The analyses reported herein reflect the stillwater elevations due to wind setup effects, but do not include additional surcharge

TABLE 1. SUMMARY OF DISCHARGES

Flooding Source and Location	Drainage Area (square miles)	Peak Discharge (cubic feet per second)			
		10-Year	50-Year	100-Year	500-Year
Clark Fork					
Below Rapid Lightning Creek	22,239	142,250	178,750	192,500	221,650
Grouse Creek					
At Mouth	60.0	2,150	3,450	4,250	6,200
At Colburn-Culver Road	55.6	2,000	3,200	3,950	5,750
Lightning Creek					
At Mouth	122	4,100	6,850	8,400	12,500
Above Spring Creek	110	3,700	6,175	7,600	11,275
Above Cascade Creek	103	3,500	5,800	7,100	10,550
Mosquito Creek					
At Mouth	7.2[1]	350	425	450	550
Above Burlington Northern Railroad	7.2	400	550	675	950
Pack River					
At State Route 200	291	9,500	16,000	19,500	29,500
Above Trout Creek	278	9,000	15,250	18,750	28,250
Above Rapid Lightning Creek	228	7,500	12,500	15,500	23,250
Above Gold Creek	214	7,000	11,750	14,500	21,750
Above Grouse Creek	147	4,900	8,200	10,000	15,000
Above Sand Creek	127	4,250	7,100	8,700	13,000
At U.S. Geological Survey Gage Station Near Colburn	124	4,200	7,000	8,500	12,750
Above Colburn Creek	103	3,500	5,800	7,150	10,500
Above Caribou Creek	77	2,700	4,400	5,400	8,000
Above Hell Roaring Creek	61	2,200	3,500	4,300	6,300
Pend Oreille River					
At Newport, Washington	---[2]	---[2]	---[2]	154,000	---[2]

[1] Flows Routed by Burlington Northern Railroad Embankment

[2] Data Not Available

TABLE 1. SUMMARY OF DISCHARGES (Cont'd)

Flooding Source and Location	Drainage Area (square miles)	Peak Discharge (cubic feet per second) 10-Year	50-Year	100-Year	500-Year
Priest River					
At Mouth	907	9,050	10,550	11,100	12,200
Near McAbee Falls	861	8,500	10,000	10,600	11,900
Above Midpoint on Section Line 27/28	795	8,300	9,700	10,300	11,600
Above East River	726	8,000	9,400	10,000	11,200
Rapid Lightning Creek					
At Mouth	48.0	1,750	2,800	3,450	5,000
Above Cross Section BO	34.1	1,300	2,050	2,550	3,550
Above Spring Creek	28.6	1,150	1,750	2,150	3,000
Sand Creek North					
At Mouth	17.0	750	1,100	1,350	1,900
Sand Creek					
At Mouth	38.5	1,455	2,280	2,820	4,015
Above Little Sand Creek	23.2	960	1,455	1,780	2,510
Above Schweitzer Creek	16.1	715	1,065	1,295	1,830
Above Cross Section AO	12.1	575	840	1,020	1,445
Above Cross Section AS	8.3	435	625	760	1,075
Above Swede Creek	6.8	375	535	660	915
Above Cross Section AY	4.0	260	395	470	660
Above Jack Creek	2.1	185	295	360	510
Spring Creek					
At Mouth	11.2	550	800	950	1,350
Above Cross Section AA	9.7	500	700	850	1,200

TABLE 2. SUMMARY OF LAKE ELEVATIONS

Flooding Source and Location	Drainage Area (Square Miles)	Peak Elevations (Feet) 10-Year	100-Year
Cocolalla	58.1	2,208.8	2,211.9
Kelso	10.7	2,153.7	2,154.1
Pend Oreille	22,900	2,064.0	2,069.8

elevation from wave crest height and wave runup. These surcharge elevations were considered only for Lake Pend Oreille and are explained in detail in Section 3.2 of this study.

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of the flooding sources studied in the county were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each of these flooding sources.

Water-surface elevations were computed for the 10-, 50-, 100-, and 500-year floods through use of the U.S. Army Corps of Engineers HEC-2 standard step-backwater computer program (Reference 15) for all detailed study areas.

Cross section data for Pack River below Rapid Lightning Creek Road were obtained from a previous report published by the U.S. Army Corps of Engineers (Reference 5). The sections were field surveyed.

Cross section data for backwater analysis of all other streams studied by detailed methods were digitized using aerial photography dated November 1977 and September 1981 (Reference 16). The below-water sections were field measured. All bridges, culverts, and other hydraulic structures were surveyed in order to obtain elevation data and structural geometry.

Cross sections for all streams studied by detailed methods were located at close intervals above and below bridges, culverts, and other hydraulic structures in order to compute the significant backwater caused by these structures.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway is computed (Section 4.2), selected cross section locations are also shown on the Flood Boundary and Floodway Map (Exhibit 2).

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals (Exhibit 1).

Roughness characteristics (Mannings "n") of the channel and flood plain areas used in the backwater computations were estimated during field reconnaissance and are tabulated as follows:

Range of Manning's "n"

	Channel	Overbank Flood Plain
Clark Fork	0.031	0.060 to 0.120
Grouse Creek	0.055	0.070 to 0.140
Lightning Creek	0.048 to 0.070	0.080 to 0.250
Mosquito Creek	0.055 to 0.060	0.060 to 0.150
Pack River	0.048 to 0.055	0.085 to 0.175
Priest River	0.040 to 0.155	0.040 to 0.200
Rapid Lightning Creek	0.040 to 0.070	0.040 to 0.200
Sand Creek North	0.070 to 0.080	0.140 to 0.200
Sand Creek	0.045 to 0.065	0.045 to 0.200
Spring Creek	0.070 to 0.095	0.080 to 0.350

Starting water-surface elevations for all streams were calculated using slope-area methods. Backwater at confluences with larger river systems or lakes are shown at the most downstream reaches of the smaller tributary stream on the flood profiles.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed and do not fail.

Hydraulic analyses of the outlet structures for Cocolalla and Kelso Lakes were conducted in order to provide rating for outflow from the lakes. All structures were measured by field surveys.

It was agreed between the Federal Emergency Management Agency and the study contractor to consider wave height analyses for Lake Pend Oreille only. Significant wave height was calculated using procedures as outlined in ETL-1110-2-221 (References 17 and 18). Input for the calculations included wind direction, duration, and speed along with reservoir shape and size. The calculated wave height was added as a surcharge to the 100-year stillwater lake elevation. No wave runup analysis was conducted.

No analyses of wave height or runup were conducted for any of the additional lakes studied in Bonner County.

Streams and rivers, selected for study by approximate methods, were analyzed by some combination of these five criteria: 1) correlation considering size of drainage area, slope, vegetative cover, and hydraulic conditions with other streams studied by detailed methods within the region; 2) field reconnaissance and historical accounts using information provided by local residents familiar with flooded areas and boundaries during past flooding events; 3) correlation with the U.S. Geological Survey maps of flood-prone areas; 4) correlation with flood boundaries as outined on the special Flood Hazard Boundary Map for Bonner County (Reference 19); and 5) engineering judgment.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in the study are shown on the maps.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages State and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the Federal Emergency Management Agency as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the county. For each stream studied in detail, the boundaries of the 100- and 500-year floods have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries for Clark Fork, Grouse Creek, Pack River, Rapid Lightning Creek, and Sand Creek North were interpolated using aerial photographs at a scale of 1:14,400 dated November 1977 and September 1981 and field verified (Reference 16). Between cross sections, the boundaries for Clark Fork, Pack River, Sand Creek, and Priest River were interpolated using aerial photographs at a scale of 1:12,000 dated November 1977 and September 1981 and field verified (Reference 16). Detailed topographic maps at a scale of 1:2,400, with a contour interval of 5 feet, were constructed from aerial photographs dated November 1977 at a scale of 1:14,400 for the flood plain areas of Lightning, Mosquito, and Spring Creeks (Reference 16). These maps were used to interpolate the flood boundaries between cross sections for these streams.

For Lake Pend Oreille, Lake Kelso, and Lake Cocolalla, boundaries for the 100-year flood were delineated using topographic maps at scales of 1:24,000 and 1:62,500, with contour intervals of 20 and 40 feet (References 20 and 21).

Approximate flood boundaries have been delineated using topographic maps (References 20 and 21). Approximate flood boundaries in some portions of the study area were taken from the Flood Hazard Boundary Map (Reference 19).

Flooding from all or part of the following approximate study streams was not shown because the areas of flooding are less than 200 feet wide: Berry Creek, Blanchard Creek, Bodie Canyon, Cocolalla Creek, Dry Creek, Fish Creek, Little Sand Creek, Poirier Creek, Quartz Creek, Riser Creek, Snow Creek, Strong Creek, Trestle Creek, Trout Creek, Twin Creek, unnamed tributary to Tunnel Creek, unnamed tributary to Clark Fork, unnamed tributary to Snow Creek, unnamed tributary to Bodie Canyon, and Valley Creek.

Flood boundaries for the 100- and 500-year floods are shown on the Flood Boundary and Floodway Map (Exhibit 2). In cases where the 100- and 500-year flood boundaries are close together, only the 100-year flood boundary has been shown. Small areas within the flood boundaries may lie above the flood elevations and, therefore, not be subject to flooding; owing to limitations of the map scale, such areas are not shown.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity, increases the flood heights of streams, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood may be carried without substantial increases in flood heights. Minimum standards of the Federal Emergency Management Agency limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this report are presented to local agencies as minimum standards that can be adopted or that can be used as a basis for additional studies.

The floodways presented in this study were computed on the basis of equal-conveyance reduction from each side of the flood plain. The results of these computations were tabulated at selected cross sections for each stream segment for which a floodway was computed (Table 3).

As shown on the Flood Boundary and Floodway Map (Exhibit 2), the floodway widths were determined at cross sections; between cross sections, the boundaries were interpolated. In cases where the boundaries of the floodway and the 100-year flood are either close together or collinear, only the floodway boundary has been shown.

A floodway was not calculated for the portion of Clark Fork River between Lightning Creek and Lake Pend Oreille due to the tremendous amount of overbank storage and split main channel areas.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Clark Fork								
AA[2]	0				2,070.2			
AB[2]	4,400				2,070.6			
AC[2]	7,050				2,071.2			
AD[2]	9,850				2,072.3			
A	11,800	4,500	46,658	4.1	2,072.9	2,072.9	2,073.9	1.0
B	14,800	3,000	30,383	6.3	2,074.6	2,074.6	2,075.5	0.9
C	16,570	1,900	25,790	7.5	2,075.9	2,075.9	2,076.6	0.7
D	18,690	910	20,169	9.5	2,077.3	2,077.3	2,077.8	0.5
E	19,490	781	18,453	10.4	2,077.6	2,077.6	2,078.2	0.6
F	40,100	657	17,148	11.2	2,078.8	2,078.8	2,079.3	0.5
G	22,520	1,460	23,183	8.3	2,081.0	2,081.0	2,081.2	0.2
H	24,530	1,232	23,287	8.3	2,082.0	2,082.0	2,082.3	0.3
I	26,480	3,340	43,155	4.5	2,083.3	2,083.3	2,083.9	0.6
J	29,640	1,327	24,248	7.9	2,084.5	2,084.5	2,085.0	0.5
K	31,840	858	19,059	10.1	2,086.0	2,086.0	2,086.6	0.6
L	32,510	724	17,891	10.8	2,086.4	2,086.4	2,087.0	0.6
M	35,270	395	15,821	12.2	2,087.7	2,087.7	2,088.4	0.7
N	36,950	525	17,020	11.3	2,089.1	2,089.1	2,089.8	0.7
O	38,210	1,102	26,712	7.2	2,091.1	2,091.1	2,091.7	0.6
P	41,220	545	21,907	8.8	2,091.8	2,091.8	2,092.5	0.7
Q	43,700	527	17,534	11.0	2,092.3	2,092.3	2,093.1	0.8
R	46,870	450	22,336	8.6	2,094.1	2,094.1	2,095.0	0.9
S	49,600	492	29,835	6.5	2,095.1	2,095.1	2,096.1	0.9
T	51,910	363	17,439	11.0	2,095.1	2,095.1	2,096.0	0.9
U	54,360	390	26,852	7.2	2,096.7	2,096.7	2,097.7	1.0

[1] Feet Above Lake Pend Oreille [2] No Floodway Computed

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

FLOODWAY DATA

CLARK FORK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Grouse Creek								
A	1,970	500	2,169	2.0	2,096.1	2,095.2[2]	2,095.7[2]	0.5
B	3,110	400	2,430	1.7	2,096.1	2,095.9[2]	2,096.5[2]	0.6
C	4,030	420	2,042	2.1	2,096.5	2,096.5	2,097.1	0.6
D	5,570	420	1,957	2.2	2,098.2	2,098.2	2,098.7	0.5
E	6,600	590	3,034	1.4	2,099.0	2,099.0	2,099.5	0.5
F	7,280	274	1,666	2.6	2,099.4	2,099.4	2,099.9	0.5
G	7,660	94	841	5.1	2,099.8	2,099.8	2,100.3	0.5
H	8,740	487	3,597	1.2	2,100.8	2,100.8	2,101.5	0.7
I	9,810	521	4,174	1.0	2,101.3	2,101.3	2,101.8	0.5
J	11,160	589	2,789	1.5	2,102.3	2,102.3	2,102.5	0.2
K	12,960	800	1,924	2.2	2,106.1	2,106.1	2,107.0	0.9
L	14,100	880	1,655	2.6	2,112.1	2,112.1	2,112.9	0.8
M	15,070	1,000	2,053	2.1	2,117.7	2,117.7	2,118.0	0.3
N	15,630	1,000	1,882	2.3	2,119.8	2,119.8	2,120.7	0.9
O	16,710	765	1,365	3.1	2,127.4	2,127.4	2,127.9	0.5
P	17,060	650	1,328	3.2	2,130.2	2,130.2	2,130.6	0.4
Q	17,655	440	1,653	2.6	2,133.0	2,133.0	2,133.7	0.7
R	18,355	375	991	4.3	2,136.7	2,136.7	2,137.1	0.4
S	18,685	295	1,206	3.5	2,139.1	2,139.1	2,139.3	0.2
T	19,565	500	1,703	2.5	2,144.2	2,144.2	2,144.8	0.6
U	19,909	550	2,682	1.5	2,148.6	2,148.6	2,148.8	0.2
V	20,179	700	2,573	1.5	2,148.8	2,148.8	2,149.3	0.5
W	20,689	555	1,175	3.4	2,151.8	2,151.8	2,152.8	1.0
X	21,004	610	1,469	2.7	2,154.5	2,154.5	2,155.1	0.6
Y	21,294	480	854	4.6	2,156.8	2,156.8	2,157.7	0.9
Z	22,174	440	999	4.0	2,167.2	2,167.2	2,168.1	0.9

[1] Feet Above Mouth [2] Elevation Computed Without Consideration of Backwater From Pack River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

FLOODWAY DATA

GROUSE CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Grouse Creek (Cont'd)								
AA	23,174	508	777	5.1	2,181.8	2,181.8	2,181.8	0.0
AB	23,634	650	1,165	3.4	2,187.1	2,187.1	2,188.0	0.9
AC	23,904	150	514	7.7	2,191.2	2,191.2	2,191.5	0.3
Lightning Creek								
A	5,545	451/150[2]	1,449	5.8	2,102.9	2,102.9	2,103.0	0.1
B	5,890	376	1,307	6.4	2,105.6	2,105.6	2,105.6	0.0
C	6,210	291	1,371	6.1	2,107.8	2,107.8	2,107.8	0.0
D	6,660	425/280[2]	1,363	6.2	2,111.4	2,111.4	2,111.4	0.0
E	7,610	886	1,954	4.3	2,120.9	2,120.9	2,120.9	0.0
F	8,655	628	1,238	6.1	2,134.1	2,134.1	2,134.1	0.0
G	9,360	987	2,073	3.7	2,141.8	2,141.8	2,142.0	0.2
H	10,040	800	1,455	5.2	2,149.5	2,149.5	2,149.5	0.0
I	10,870	491	1,474	5.2	2,158.9	2,158.9	2,159.1	0.2
J	11,310	331	1,264	6.0	2,162.9	2,162.9	2,163.0	0.1
K	11,885	405	1,069	7.1	2,171.4	2,171.4	2,171.4	0.0
L	12,375	358	1,199	6.3	2,178.7	2,178.7	2,178.9	0.2
M	13,145	647	1,599	4.8	2,187.5	2,187.5	2,187.6	0.1
N	13,865	591	1,549	4.9	2,194.8	2,194.8	2,194.8	0.0
O	14,245	709	1,416	5.4	2,199.6	2,199.6	2,200.0	0.4
P	14,635	679	1,819	4.2	2,204.4	2,204.4	2,204.6	0.2
Q	15,150	869	1,719	4.4	2,209.3	2,209.3	2,209.3	0.0
R	15,620	479	1,369	5.6	2,214.6	2,214.6	2,214.6	0.0
S	16,035	809	1,780	4.3	2,219.9	2,219.9	2,219.9	0.0
T	16,655	654	1,452	5.2	2,227.4	2,227.4	2,227.4	0.0

[1] Feet Above Mouth [2] Width/Width Within County Limits

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

FLOODWAY DATA

GROUSE CREEK-LIGHTNING CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Lightning Creek (Cont'd)								
U	17,035	754	1,766	4.3	2,231.7	2,231.7	2,231.7	0.0
V	17,410	1,069	1,324	5.7	2,237.5	2,237.5	2,237.5	0.0
W	17,715	1,055	2,163	3.5	2,243.7	2,243.7	2,243.9	0.2
X	17,975	772	1,703	4.5	2,246.8	2,246.8	2,247.1	0.3
Y	18,635	809	1,769	4.3	2,256.6	2,256.6	2,256.7	0.1
Z	19,360	919	2,489	3.1	2,263.6	2,263.6	2,264.6	1.0
AA	19,870	799	1,876	4.1	2,270.5	2,270.5	2,270.5	0.0
AB	20,440	642	1,746	4.4	2,277.1	2,277.1	2,277.5	0.4
AC	20,920	542	1,778	4.3	2,282.4	2,282.4	2,282.6	0.2
AD	21,370	412	1,161	6.5	2,289.0	2,289.0	2,289.8	0.8
AE	21,750	551	2,149	3.5	2,294.1	2,294.1	2,294.7	0.6
AF	22,180	262	999	7.6	2,300.0	2,300.0	2,300.8	0.8
AG	22,380	330	1,436	4.9	2,303.0	2,303.0	2,304.0	1.0
AH	22,590	304	1,398	5.1	2,305.1	2,305.1	2,305.9	0.8
AI	22,765	304	1,161	6.1	2,307.3	2,307.3	2,308.1	0.8
AJ	22,925	191	896	7.9	2,309.9	2,309.9	2,310.6	0.7
AK	23,135	241	1,209	5.9	2,313.2	2,313.2	2,314.2	1.0

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[1] Feet Above Mouth

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

FLOODWAY DATA

LIGHTNING CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Pack River								
A	3,325	1,803	4,581	4.3	2,069.8	2,063.8[2]	2,064.8[2]	1.0
B	6,425	1,524	7,656	2.5	2,069.8	2,066.8[2]	2,067.8[2]	1.0
C	9,625	2,093	9,191	2.1	2,069.8	2,068.2[2]	2,069.2[2]	1.0
D	10,605	695	3,612	5.4	2,069.8	2,069.1[2]	2,070.0[2]	0.9
E	12,380	796	7,389	2.5	2,071.9	2,071.9	2,072.6	0.7
F	14,900	1,216	10,753	1.7	2,073.3	2,073.3	2,074.2	0.9
G	16,530	1,137	9,966	1.9	2,073.8	2,073.8	2,074.8	1.0
H	17,710	1,317	7,786	2.4	2,074.4	2,074.4	2,075.4	1.0
I	20,360	1,416	11,074	1.7	2,075.8	2,075.8	2,076.8	1.0
J	21,960	1,466	10,487	1.8	2,076.4	2,076.4	2,077.4	1.0
K	23,760	1,221	14,264	1.3	2,077.1	2,077.1	2,078.1	1.0
L	27,680	1,628	15,747	1.2	2,077.8	2,077.8	2,078.8	1.0
M	28,860	1,977	18,392	1.0	2,078.0	2,078.0	2,079.0	1.0
N	30,440	1,346	13,889	1.3	2,078.5	2,078.5	2,079.5	1.0
O	32,740	624	5,639	3.3	2,079.5	2,079.5	2,080.5	1.0
P	34,195	307	2,589	6.0	2,083.1	2,083.1	2,083.7	0.6
Q	34,790	371	4,472	3.5	2,084.2	2,084.2	2,084.7	0.5
R	36,085	1,347	15,187	1.0	2,084.5	2,084.5	2,085.1	0.6
S	37,945	2,060	21,632	0.7	2,084.7	2,084.7	2,085.3	0.6
T	39,195	1,293	13,909	1.1	2,084.7	2,084.7	2,085.3	0.6
U	39,825	1,532	13,346	1.1	2,084.8	2,084.8	2,085.4	0.6
V	40,695	816	6,551	2.2	2,084.9	2,084.9	2,085.5	0.6
W	41,485	1,205	9,249	1.6	2,085.1	2,085.1	2,085.8	0.7
X	42,965	901	5,903	2.5	2,085.6	2,085.6	2,086.4	0.8
Y	44,005	989	10,900	1.3	2,086.2	2,086.2	2,087.2	1.0
Z	45,605	1,394	13,440	1.1	2,086.6	2,086.6	2,087.6	1.0

[1] Feet Above State Highway 200 [2] Elevation Computed Without Consideration of Backwater From Lake Pend Oreille

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

FLOODWAY DATA

PACK RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Pack River (Cont'd)								
AA	46,265	1,608	14,026	1.0	2,086.7	2,086.7	2,087.7	1.0
AB	47,345	2,061	15,367	0.9	2,087.3	2,087.3	2,088.3	1.0
AC	49,670	1,350	10,589	1.4	2,088.0	2,088.0	2,089.0	1.0
AD	52,390	1,474	12,159	1.2	2,089.0	2,089.0	2,090.0	1.0
AE	53,730	1,750	16,665	0.9	2,089.3	2,089.3	2,090.3	1.0
AF	55,430	1,463	13,833	1.0	2,089.6	2,089.6	2,090.6	1.0
AG	56,575	1,752	16,146	0.9	2,089.9	2,089.9	2,090.9	1.0
AH	64,240	1,405	8,642	1.7	2,092.1	2,092.1	2,093.1	1.0
AI	70,825	1,306	10,722	1.4	2,094.2	2,094.2	2,095.2	1.0
AJ	72,005	1,760	17,640	0.8	2,094.5	2,094.5	2,095.5	1.0
AK	73,660	1,010	7,774	1.9	2,095.1	2,095.1	2,096.1	1.0
AL	74,675	746	5,980	2.4	2,095.9	2,095.9	2,096.9	1.0
AM	76,775	855	8,471	1.2	2,096.8	2,096.8	2,097.8	1.0
AN	77,820	1,370	6,930	1.4	2,097.1	2,097.1	2,098.1	1.0
AO	78,195	521	3,547	2.8	2,097.6	2,097.6	2,098.6	1.0
AP	79,200	559	5,388	1.9	2,098.3	2,098.3	2,099.3	1.0
AQ	80,140	604	5,968	1.7	2,098.6	2,098.6	2,099.6	1.0
AR	81,600	1,251	11,148	0.9	2,099.1	2,099.1	2,100.1	1.0
AS	83,280	1,096	10,160	1.0	2,099.4	2,099.4	2,100.4	1.0
AT	84,780	1,081	6,073	1.6	2,100.1	2,100.1	2,101.1	1.0
AU	86,100	1,110	7,549	1.2	2,101.2	2,101.2	2,102.1	0.9
AV	88,241	874	6,239	1.4	2,102.0	2,102.0	2,102.9	0.9
AW	89,481	982	5,083	1.7	2,102.6	2,102.6	2,103.5	0.9
AX	92,851	168	1,804	4.8	2,105.2	2,105.2	2,106.2	1.0
AY	94,181	419	4,021	2.2	2,106.7	2,106.7	2,107.7	1.0
AZ	94,646	118	1,713	5.1	2,107.0	2,107.0	2,108.0	1.0

[1] Feet Above State Highway 200

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

FLOODWAY DATA

PACK RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Pack River (Cont'd)								
BA	95,212	132	2,070	4.2	2,107.7	2,107.7	2,108.7	1.0
BB	95,742	102	1,305	6.5	2,108.1	2,108.1	2,109.1	1.0
BC	96,297	892	10,689	0.8	2,109.0	2,109.0	2,110.0	1.0
BD	98,597	1,593	15,516	0.5	2,109.2	2,109.2	2,110.2	1.0
BE	100,617	1,438	13,688	0.6	2,109.3	2,109.3	2,110.3	1.0
BF	101,847	1,078	7,733	1.1	2,109.6	2,109.6	2,110.6	1.0
BG	103,177	1,013	8,867	1.0	2,110.0	2,110.0	2,111.0	1.0
BH	104,257	1,206	10,659	0.7	2,110.2	2,110.2	2,111.2	1.0
BI	106,512	1,248	10,479	0.7	2,110.4	2,110.4	2,111.4	1.0
BJ	109,232	977	6,324	1.1	2,111.1	2,111.1	2,112.1	1.0
BK	110,592	1,185	8,984	0.8	2,111.5	2,111.5	2,112.5	1.0
BL	112,032	1,292	10,471	0.7	2,111.8	2,111.8	2,112.8	1.0
BM	112,782	1,083	7,344	1.0	2,112.0	2,112.0	2,113.0	1.0
BN	113,542	920	7,399	1.0	2,112.3	2,112.3	2,113.3	1.0
BO	114,312	637	4,494	1.6	2,112.7	2,112.7	2,113.7	1.0
BP	114,992	616	3,710	1.9	2,113.2	2,113.2	2,114.2	1.0
BQ	115,462	933	3,818	1.9	2,113.8	2,113.8	2,114.7	0.9
BR	117,232	860	5,010	1.4	2,116.0	2,116.0	2,116.5	0.5
BS	118,102	382	2,571	2.8	2,116.8	2,116.8	2,117.5	0.7
BT	118,842	547	4,473	1.6	2,117.5	2,117.5	2,118.3	0.8
BU	119,452	793	4,705	1.5	2,117.8	2,117.8	2,118.6	0.8
BV	120,042	546	4,156	1.7	2,118.3	2,118.3	2,119.1	0.8
BW	121,392	664	2,672	2.7	2,119.6	2,119.6	2,120.3	0.7
BX	122,962	667	4,950	1.4	2,121.2	2,121.2	2,121.9	0.7
BY	123,622	789	6,261	1.1	2,121.6	2,121.6	2,122.3	0.7
BZ	124,837	690	3,811	1.9	2,122.2	2,122.2	2,123.0	0.8

[1] Feet Above State Highway 200

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

FLOODWAY DATA

PACK RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Pack River (Cont'd)								
CA	127,037	954	5,473	1.3	2,123.7	2,123.7	2,124.6	0.9
CB	128,227	1,059	7,837	0.9	2,124.2	2,124.2	2,125.2	1.0
CC	129,717	669	3,841	1.9	2,125.5	2,125.5	2,126.5	1.0
CD	130,777	922	5,030	1.4	2,127.1	2,127.1	2,128.1	1.0
CE	131,557	793	3,462	2.1	2,128.2	2,128.2	2,129.2	1.0
CF	133,187	592	3,166	2.3	2,131.2	2,131.2	2,132.2	1.0
CG	133,592	723	3,205	2.2	2,132.9	2,132.9	2,133.9	1.0
CH	134,227	839	3,247	2.2	2,134.2	2,134.2	2,135.2	1.0
CI	135,297	758	2,869	2.5	2,136.4	2,136.4	2,137.4	1.0
CJ	136,117	498	2,250	3.2	2,138.5	2,138.5	2,139.5	1.0
CK	137,147	1,061	3,192	2.2	2,141.9	2,141.9	2,142.9	1.0
CL	138,077	740	4,074	1.8	2,144.2	2,144.2	2,145.2	1.0
CM	138,807	322	1,535	4.7	2,146.5	2,146.5	2,147.1	0.6
CN	139,517	506	1,878	3.8	2,149.6	2,149.6	2,149.9	0.3
CO	140,107	163	878	8.1	2,152.8	2,152.8	2,153.5	0.7
CP	140,747	203	1,412	5.1	2,156.3	2,156.3	2,157.3	1.0
CQ	141,797	175	1,143	6.3	2,160.7	2,160.7	2,161.2	0.5
CR	142,217	244	1,663	4.3	2,162.5	2,162.5	2,163.1	0.6
CS	143,417	150	995	7.2	2,167.6	2,167.6	2,168.5	0.9
CT	144,017	164	947	5.7	2,171.4	2,171.4	2,172.1	0.7
CU	144,627	86	733	7.4	2,175.9	2,175.9	2,176.5	0.6
CV	144,987	110	924	5.8	2,177.5	2,177.5	2,178.4	0.9
CW	145,837	265	1,129	4.8	2,180.5	2,180.5	2,181.5	1.0
CX	146,527	240	1,224	4.4	2,183.5	2,183.5	2,184.2	0.7
CY	146,977	160	1,050	5.1	2,185.2	2,185.2	2,185.6	0.4
CZ	147,467	468	2,324	2.3	2,186.7	2,186.7	2,187.2	0.5

[1] Feet Above State Highway 200

TABLE 3	FEDERAL EMERGENCY MANAGEMENT AGENCY BONNER COUNTY, ID (UNINCORPORATED AREAS)	FLOODWAY DATA PACK RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Pack River (Cont'd)								
DA	148,037	194	902	6.0	2,188.8	2,188.8	2,189.5	0.7
DB	148,577	179	1,041	5.2	2,192.2	2,192.2	2,193.1	0.9
DC	149,287	377	2,108	2.6	2,194.3	2,194.3	2,195.0	0.7
DD	149,807	242	1,267	4.3	2,195.9	2,195.9	2,196.7	0.8
DE	150,367	199	1,126	4.8	2,198.8	2,198.8	2,199.8	1.0
DF	150,837	155	975	5.5	2,201.2	2,201.2	2,202.2	1.0
DG	151,517	182	1,042	5.2	2,204.3	2,204.3	2,205.3	1.0
DH	152,037	185	1,082	5.0	2,206.7	2,206.7	2,207.4	0.7
DI	152,757	183	1,066	5.1	2,210.1	2,210.1	2,210.5	0.4
DJ	153,217	168	919	5.9	2,212.5	2,212.5	2,213.1	0.6
DK	153,807	77	585	9.2	2,216.7	2,216.7	2,217.0	0.3
DL	154,287	193	1,126	3.8	2,219.7	2,219.7	2,220.1	0.4
DM	154,847	205	853	5.0	2,221.8	2,221.8	2,222.0	0.2
DN	155,377	120	512	8.4	2,226.6	2,226.6	2,227.0	0.4
DO	155,957	110	635	6.8	2,232.1	2,232.1	2,233.1	1.0
DP	156,387	64	381	11.3	2,237.7	2,237.7	2,238.1	0.4

[1] Feet Above State Highway 200

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

FLOODWAY DATA

PACK RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE[3]
					(FEET NGVD)			
Priest River								
A	0	545	2945	3.8	2066.3	2057.7[2]	2058.3[2]	0.6
B	771	325/160[3]	1850	6.0	2066.3	2058.4[2]	2059.0[2]	0.6
C	1,371	616/210[3]	3447	3.2	2066.3	2059.9[2]	2060.2[2]	0.3
D	1,948	234/100[3]	1572	7.1	2066.3	2059.9[2]	2060.5[2]	0.6
E	2,383	329/150[3]	2885	3.8	2066.3	2061.3[2]	2061.7[2]	0.4
F	3,168	325/125[3]	2086	5.3	2066.3	2062.0[2]	2062.3[2]	0.3
G	3,618	289/170[3]	2480	4.5	2066.3	2062.6[2]	2062.8[2]	0.2
H	4,638	226	1412	7.9	2066.3	2063.9[2]	2064.0[2]	0.1
I	5,218	240	2077	5.3	2066.3	2065.9[2]	2065.9[2]	0.0
J	6,028	231	1948	5.7	2067.1	2067.1[2]	2067.1[2]	0.0
K	6,533	272	1803	6.2	2067.9	2067.9[2]	2067.9[2]	0.0
L	7,873	231	2323	4.8	2070.9	2070.9	2071.1	0.2
M	8,823	223	1731	6.4	2073.6	2073.6	2073.9	0.3
N	9,833	283	2426	4.6	2077.6	2077.6	2077.7	0.1
O	10,538	301	1719	6.5	2080.0	2080.0	2080.1	0.1
P	11,633	219	2388	4.6	2083.6	2083.6	2083.9	0.3
Q	12,493	271	2313	4.8	2085.4	2085.4	2085.8	0.4
R	13,113	200	2031	5.5	2087.3	2087.3	2087.5	0.2
S	13,633	289	2849	3.9	2088.3	2088.3	2088.6	0.3
T	14,268	219	1779	6.2	2088.6	2088.6	2088.9	0.3
U	15,668	215	1832	6.1	2091.2	2091.2	2091.3	0.1
V	17,008	180	2114	5.3	2092.8	2092.8	2092.9	0.1

[1] Feet Above Mouth [2] Elevation Computed Without Consideration of Backwater From Pend Oreille River

[3] Width/Width within County Limits

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

FLOODWAY DATA

PRIEST RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Priest River (Cont'd)								
W	0	182	1,869	5.7	2,182.2	2,182.2	2,183.2	1.0
X	885	107	1,269	8.4	2,184.0	2,184.0	2,184.9	0.9
Y	1,770	139	1,322	8.0	2,186.8	2,186.8	2,187.8	1.0
Z	3,030	1,055[2]	2,739	3.9	2,189.8	2,189.8	2,190.5	0.7
AA	3,905	591	3,820	2.8	2,190.6	2,190.6	2,191.4	0.8
AB	7,230	615	5,110	2.1	2,192.1	2,192.1	2,193.1	1.0
AC	9,450	436	2,837	3.7	2,193.5	2,193.5	2,194.4	0.9
AD	12,725	1,608	6,396	1.7	2,195.5	2,195.5	2,196.5	1.0
AE	16,995	1,107	6,706	1.6	2,197.4	2,197.4	2,198.4	1.0
AF	18,895	381	4,300	2.5	2,198.0	2,198.0	2,199.0	1.0
AG	19,185	520	2,981	3.6	2,198.9	2,198.9	2,199.8	0.9
AH	20,805	313	2,491	4.3	2,199.9	2,199.9	2,200.9	1.0
AI	21,475	212	2,134	5.0	2,200.4	2,200.4	2,201.4	1.0
AJ	23,830	379	3,437	3.1	2,202.2	2,202.2	2,203.2	1.0
AK	25,145	197	2,416	4.4	2,203.0	2,203.0	2,204.0	1.0
AL	26,480	139	1,724	6.1	2,204.4	2,204.4	2,205.4	1.0
AM	27,515	211	2,297	4.6	2,205.9	2,205.9	2,206.9	1.0
AN	28,645	238	2,820	3.8	2,206.9	2,206.9	2,207.8	0.9
AO	29,745	199	2,310	4.6	2,207.6	2,207.6	2,208.4	0.8
AP	30,780	207	2,114	5.0	2,208.7	2,208.7	2,209.4	0.7

[1] Feet Above Cross Section W [2] Width Includes Islands

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

FLOODWAY DATA

PRIEST RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Priest River (Cont'd)								
AQ	0	177	2,080	5.0	2,239.2	2,239.2	2,240.2	1.0
AR	1,400	529	3,988	2.6	2,240.4	2,240.4	2,241.4	1.0
AS	2,590	204	2,312	4.3	2,241.1	2,241.1	2,242.1	1.0
AT	3,810	521	4,045	2.5	2,242.0	2,242.0	2,242.9	0.9
AU	6,840	1,540	7,970	1.3	2,243.5	2,243.5	2,244.3	0.8
AV	8,180	1,579	8,292	1.2	2,244.1	2,244.1	2,244.8	0.7
AW	11,150	536	3,798	2.6	2,245.6	2,245.6	2,246.2	0.6
AX	14,760	567	3,296	3.0	2,248.1	2,248.1	2,249.0	0.9
AY	16,520	1,239	5,606	1.8	2,249.3	2,249.3	2,250.2	0.9
AZ	18,060	476	3,742	2.7	2,250.3	2,250.3	2,251.2	0.9
BA	19,640	2,550	12,467	0.8	2,251.0	2,251.0	2,251.9	0.9
BB	20,390	320	2,457	4.1	2,251.5	2,251.5	2,252.3	0.8
BC	22,290	1,101	4,571	2.2	2,253.3	2,253.3	2,254.2	0.9
BD	24,280	217	2,016	5.0	2,254.9	2,254.9	2,255.9	1.0
BE	25,820	640	4,707	2.1	2,256.0	2,256.0	2,257.0	1.0
BF	29,130	896	3,472	2.9	2,257.7	2,257.7	2,258.6	0.9
BG	31,470	164	1,951	5.1	2,259.8	2,259.8	2,260.8	1.0
BH	34,370	1,182	4,571	2.2	2,262.3	2,262.3	2,263.3	1.0
BI	37,910	178	2,116	4.7	2,264.9	2,264.9	2,265.9	1.0
BJ	41,140	314	2,200	3.1	2,267.0	2,267.0	2,267.9	0.9
BK	43,430	989	5,591	1.8	2,268.1	2,268.1	2,268.9	0.8
BL	47,380	1,960	7,561	1.3	2,270.6	2,270.6	2,271.2	0.6
BM	48,380	1,779	9,467	1.1	2,271.3	2,271.3	2,271.8	0.5
BN	51,880	671	4,152	2.4	2,273.2	2,273.2	2,273.8	0.6
BO	54,630	269	2,270	4.4	2,276.2	2,276.2	2,276.7	0.5

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[1] Feet Above Cross Section AQ

TABLE 3	FEDERAL EMERGENCY MANAGEMENT AGENCY BONNER COUNTY, ID (UNINCORPORATED AREAS)	FLOODWAY DATA PRIEST RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Priest River (Cont'd)								
BP	56,880	163	1,834	5.5	2,279.1	2,279.1	2,279.6	0.5
BQ	56,780	280	2,861	3.5	2,280.8	2,280.8	2,281.5	0.7
BR	60,640	199	1,917	5.2	2,282.6	2,282.6	2,283.4	0.8
BS	63,850	190	2,115	4.7	2,286.5	2,286.5	2,287.4	0.9
BT	66,240	223	2,284	4.4	2,289.2	2,289.2	2,289.9	0.7
BU	68,010	900	5,272	1.9	2,291.1	2,291.1	2,291.9	0.8
BV	68,970	1,160	6,435	1.6	2,292.3	2,292.3	2,293.2	0.9
BW	70,070	383	2,976	3.4	2,293.6	2,293.6	2,294.3	0.7
BX	70,730	261	2,350	4.3	2,294.2	2,294.2	2,294.8	0.6
BY	71,860	267	2,030	4.9	2,295.7	2,295.7	2,296.4	0.7
BZ	72,680	178	1,483	6.7	2,297.6	2,297.6	2,298.2	0.6
CA	73,320	290	2,208	4.5	2,299.6	2,299.6	2,300.0	0.4
CB	74,090	189	1,661	6.0	2,301.0	2,301.0	2,301.2	0.2

[1] Feet Above Cross Section AQ

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

FLOODWAY DATA

PRIEST RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Rapid Lightning Creek								
A	250	370	1,321	2.6	2,080.3	2,075.0[2]	2,076.0[2]	1.0
B	830	424	1,337	2.6	2,080.3	2,078.2[2]	2,078.9[2]	0.7
C	1,320	408	1,400	2.5	2,081.0	2,081.0	2,082.0	1.0
D	1,680	388	1,173	2.9	2,083.9	2,083.9	2,084.8	0.9
E	2,080	500	1,603	2.2	2,086.8	2,086.8	2,087.8	1.0
F	2,620	500	1,198	2.9	2,090.6	2,090.6	2,091.4	0.8
G	2,776	587	1,609	2.1	2,093.4	2,093.4	2,094.1	0.7
H	3,056	618	1,690	2.0	2,094.8	2,094.8	2,095.3	0.5
I	3,316	416	820	4.2	2,097.9	2,097.9	2,098.3	0.4
J	3,736	291	987	3.5	2,103.0	2,103.0	2,103.5	0.5
K	3,906	300	803	4.3	2,104.9	2,104.9	2,105.2	0.3
L	4,366	95	498	6.9	2,110.1	2,110.1	2,110.5	0.4
M	4,696	137	576	6.0	2,113.9	2,113.9	2,114.6	0.7
N	5,121	299	1,381	2.5	2,117.7	2,117.7	2,118.4	0.7
O	5,396	315	934	3.7	2,120.7	2,120.7	2,121.3	0.6
P	5,941	142	927	3.7	2,125.7	2,125.7	2,126.6	0.9
Q	6,346	66	419	8.2	2,129.5	2,129.5	2,130.3	0.8
R	7,081	114	670	5.1	2,139.3	2,139.3	2,139.8	0.5
S	7,811	82	475	7.3	2,148.0	2,148.0	2,148.8	0.8
T	8,091	79	490	7.0	2,152.1	2,152.1	2,152.7	0.6
U	3,511	125	697	5.0	2,157.2	2,157.2	2,158.0	0.8
V	8,951	133	728	4.7	2,162.5	2,162.5	2,163.2	0.7
W	9,311	118	554	6.2	2,168.8	2,168.8	2,169.6	0.8
X	9,816	121	727	4.7	2,178.0	2,178.0	2,178.9	0.9
Y	10,216	83	368	9.4	2,187.9	2,187.9	2,188.3	0.4
Z	10,411	57	355	9.7	2,194.0	2,194.0	2,194.4	0.4

[1] Feet Above Mouth [2] Elevation Computed Without Consideration of Backwater From Pack River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

FLOODWAY DATA

RAPID LIGHTNING CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Rapid Lightning Creek (Cont'd)								
AA	10,591	123	598	5.8	2,201.2	2,201.2	2,202.0	0.8
AB	10,701	30	226	15.3	2,210.8	2,210.8	2,211.3	0.5
AC	10,951	70	365	9.5	2,232.9	2,232.9	2,233.5	0.6
AD	11,021	62	393	8.8	2,238.3	2,238.3	2,238.5	0.2
AE	11,231	176	1,089	3.2	2,244.1	2,244.1	2,244.9	0.8
AF	11,486	75	476	7.2	2,247.5	2,247.5	2,247.9	0.4
AG	11,641	66	383	9.0	2,250.9	2,250.9	2,251.7	0.8
AH	11,971	129	545	6.3	2,259.0	2,259.0	2,259.5	0.5
AI	12,296	63	365	9.4	2,266.0	2,266.0	2,266.6	0.6
AJ	12,541	38	282	12.3	2,273.1	2,273.1	2,273.8	0.7
AK	12,901	92	576	6.0	2,281.2	2,281.2	2,282.1	0.9
AL	13,111	52	352	9.8	2,284.0	2,284.0	2,284.6	0.6
AM	13,346	135	500	6.9	2,290.2	2,290.2	2,290.8	0.6
AN	13,521	135	638	5.4	2,293.9	2,293.9	2,294.5	0.6
AO	13,661	197	717	4.8	2,296.1	2,296.1	2,296.4	0.3
AP	13,909	100	524	6.6	2,300.7	2,300.7	2,300.7	0.0
AQ	14,039	100	432	8.0	2,302.0	2,302.0	2,302.3	0.3
AR	14,184	107	645	5.3	2,304.8	2,304.8	2,305.6	0.8
AS	14,744	100	395	8.7	2,313.6	2,313.6	2,314.0	0.4
AT	14,954	89	362	9.5	2,319.8	2,319.8	2,319.8	0.0
AU	15,144	40	306	11.3	2,324.3	2,324.3	2,324.4	0.1
AV	15,444	49	403	8.6	2,330.1	2,330.1	2,330.8	0.7
AW	15,754	41	309	11.2	2,335.6	2,335.6	2,336.6	1.0
AX	16,054	27	226	15.3	2,346.0	2,346.0	2,346.3	0.3
AY	16,524	73	606	5.7	2,356.0	2,356.0	2,357.0	1.0
AZ	16,744	95	595	5.8	2,358.3	2,358.3	2,359.0	0.7

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[1] Feet Above Mouth

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

FLOODWAY DATA

RAPID LIGHTNING CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Rapid Lightning (Creek (Cont'd)								
BA	16,864	60	540	6.4	2,362.0	2,362.0	2,362.1	0.1
BB	17,209	112	586	5.9	2,364.6	2,364.6	2,364.8	0.2
BC	17,599	39	303	11.4	2,369.3	2,369.3	2,369.9	0.6
BD	17,934	47	430	8.0	2,374.7	2,374.7	2,375.6	0.9
BE	18,274	42	377	9.2	2,378.1	2,378.1	2,378.8	0.7
BF	18,719	169	850	4.1	2,383.3	2,383.3	2,384.1	0.8
BG	19,229	83	440	7.8	2,388.9	2,388.9	2,389.4	0.5
BH	19,409	117	562	6.1	2,391.8	2,391.8	2,392.8	1.0
BI	19,654	182	1,091	3.2	2,395.9	2,395.9	2,396.6	0.7
BJ	19,944	126	772	4.5	2,397.0	2,397.0	2,397.7	0.7
BK	20,444	111	550	6.3	2,400.9	2,400.9	2,401.6	0.7
BL	20,844	118	671	5.1	2,404.4	2,404.4	2,405.2	0.8
BM	21,309	181	936	3.7	2,407.2	2,407.2	2,408.0	0.8
BN	21,544	136	468	7.4	2,409.6	2,409.6	2,410.5	0.9
BO	21,714	227	830	4.2	2,411.9	2,411.9	2,412.9	1.0
BP	21,789	223	683	3.7	2,412.3	2,412.3	2,413.3	1.0
BQ	21,998	105	468	5.4	2,413.9	2,413.9	2,414.1	0.2
BR	22,218	70	337	7.6	2,416.1	2,416.1	2,416.5	0.4
BS	22,938	282	977	2.6	2,423.7	2,423.7	2,424.3	0.6
BT	23,448	247	768	3.3	2,429.2	2,429.2	2,430.2	1.0
BU	23,818	189	713	3.6	2,434.1	2,434.1	2,435.0	0.9
BV	24,188	158	653	3.9	2,438.2	2,438.2	2,439.2	1.0
BW	24,698	158	770	3.3	2,443.2	2,443.2	2,444.2	1.0
BX	24,888	103	523	4.9	2,444.7	2,444.7	2,445.7	1.0
BY	25,103	79	392	6.5	2,447.5	2,447.5	2,448.5	1.0
BZ	25,477	64	353	7.2	2,451.0	2,451.0	2,452.0	1.0

[1] Feet Above Mouth

TABLE 3	FEDERAL EMERGENCY MANAGEMENT AGENCY BONNER COUNTY, ID (UNINCORPORATED AREAS)	FLOODWAY DATA RAPID LIGHTNING CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Rapid Lightning (Creek (Cont'd)								
CA	25,582	50	317	8.1	2,452.2	2,452.2	2,453.1	0.9
CB	25,992	60	371	6.9	2,457.4	2,457.4	2,458.2	0.8
CC	26,612	225	608	3.5	2,463.9	2,463.9	2,464.4	0.5
CD	26,997	210	440	4.9	2,470.7	2,470.7	2,470.8	0.1
CE	27,472	151	560	3.8	2,478.3	2,478.3	2,478.8	0.5
CF	27,777	170	512	4.2	2,482.1	2,482.1	2,482.4	0.3

[1] Feet Above Mouth

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

FLOODWAY DATA

RAPID LIGHTNING CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Sand Creek North								
A	625	200	933	1.4	2,100.3	2,099.0[2]	2,100.0[2]	1.0
B	1,250	200	1,072	1.3	2,100.3	2,099.9[2]	2,100.9[2]	1.0
C	1,655	145	789	1.7	2,100.6	2,100.6	2,101.5	0.9
D	2,095	155	738	1.8	2,102.0	2,102.0	2,102.6	0.6
E	2,730	266	931	1.5	2,104.1	2,104.1	2,104.3	0.2
F	3,165	145	503	2.7	2,106.5	2,106.5	2,106.9	0.4
G	3,425	189	792	1.7	2,107.8	2,107.8	2,108.2	0.4
H	3,865	140	621	2.2	2,109.2	2,109.2	2,109.5	0.3
I	4,130	243	725	1.9	2,110.1	2,110.1	2,110.4	0.3
J	4,555	218	786	1.7	2,111.8	2,111.8	2,112.0	0.2
K	5,185	218	787	1.7	2,113.7	2,113.7	2,114.1	0.4
L	5,505	268	1,295	1.0	2,115.8	2,115.8	2,115.8	0.0
M	6,005	249	970	1.4	2,116.3	2,116.3	2,116.3	0.0
N	6,515	234	633	2.1	2,118.3	2,118.3	2,118.3	0.0
O	6,855	185	698	1.9	2,119.5	2,119.5	2,119.5	0.0
P	7,155	282	661	2.0	2,120.4	2,120.4	2,120.4	0.0
Q	7,545	192	485	2.8	2,122.2	2,122.2	2,122.2	0.0
R	7,785	110	376	3.6	2,123.7	2,123.7	2,123.8	0.1
S	8,225	280	693	1.9	2,126.4	2,126.4	2,126.5	0.1
T	8,455	145	460	2.9	2,127.8	2,127.8	2,128.1	0.3
U	8,775	200	764	1.8	2,128.8	2,128.8	2,129.3	0.5

[1] Feet Above Mouth [2] Elevation Computed Without Consideration of Backwater From Pack River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

FLOODWAY DATA

SAND CREEK NORTH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Sand Creek								
A	0	399/199[2]	2,083	1.4	2,069.8	2,061.2[3]	2,061.5[3]	0.3
B	610	639/314[2]	3,574	0.8	2,069.8	2,061.3[3]	2,061.5[3]	0.2
C	1,290	188/98[2]	1,138	2.5	2,069.8	2,061.5[3]	2,061.7[3]	0.2
D	1,910	301/91[2]	1,811	1.6	2,069.8	2,061.8[3]	2,062.1[3]	0.3
E	2,489	416/290[2]	2,418	1.2	2,069.8	2,061.9[3]	2,062.2[3]	0.3
F	3,099	471/280[2]	2,568	1.1	2,069.8	2,062.1[3]	2,062.4[3]	0.3
G	3,821	103	535	5.3	2,069.8	2,063.9[3]	2,063.9[3]	0.0
H	4,176	99	416	6.8	2,069.8	2,064.9[3]	2,064.9[3]	0.0
I	4,591	285	2,449	1.2	2,069.8	2,066.1[3]	2,066.4[3]	0.3
J	5,401	330	2,608	1.1	2,069.8	2,066.1[3]	2,066.4[3]	0.3
K	6,071	288	2,282	1.2	2,069.8	2,066.3[3]	2,066.6[3]	0.3
L	6,425	265	2,500	1.1	2,069.8	2,067.8[3]	2,068.0[3]	0.2
M	7,355	380	3,348	0.8	2,069.8	2,067.9[3]	2,068.1[3]	0.2
N	8,120	361	2,891	1.0	2,069.8	2,068.0[3]	2,068.2[3]	0.2
O	8,785	381	2,907	1.0	2,069.8	2,068.0[3]	2,068.2[3]	0.2
P	11,025	229	1,460	1.9	2,069.8	2,068.7[3]	2,069.1[3]	0.4
Q	11,920	209	1,204	2.3	2,069.8	2,069.3[3]	2,069.8[3]	0.5
R	12,465	189	736	3.8	2,070.7	2,070.7	2,071.3	0.6
S	12,730	377	2,516	1.1	2,073.3	2,073.3	2,073.6	0.3
T	13,485	248	1,158	2.4	2,074.0	2,074.0	2,074.5	0.5
U	14,760	141	479	3.7	2,078.1	2,078.1	2,078.7	0.6
V	15,620	104	481	3.7	2,081.3	2,081.3	2,081.7	0.4
W	16,385	188	1,133	1.6	2,082.6	2,082.6	2,083.1	0.5
X	17,785	155	1,232	1.4	2,083.6	2,083.6	2,084.3	0.7
Y	18,315	114	975	1.8	2,083.9	2,083.9	2,084.6	0.7
Z	18,730	86	689	2.6	2,084.1	2,084.1	2,084.9	0.8

[1] Feet Above Cross Section A [2] Width/Width Within County Limits [3] Elevation Computed Without Consideration of Backwater From Lake Pend Oreille

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

FLOODWAY DATA

SAND CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Sand Creek (Cont'd)								
AA	19,095	101	667	2.7	2,084.5	2,084.5	2,085.3	0.8
AB	20,090	156	1,336	1.3	2,085.3	2,085.3	2,086.1	0.8
AC	22,610	150	792	2.2	2,087.8	2,087.8	2,088.8	1.0
AD	23,297	175	1,213	1.5	2,089.4	2,089.4	2,090.4	1.0
AE	24,317	416	2,155	0.8	2,090.0	2,090.0	2,091.0	1.0
AF	25,662	220	827	2.2	2,091.4	2,091.4	2,092.0	0.6
AG	26,332	261	1,152	1.5	2,092.6	2,092.6	2,093.1	0.5
AH	27,477	179	764	2.3	2,094.1	2,094.1	2,094.6	0.5
AI	28,357	322	1,256	1.4	2,095.3	2,095.3	2,095.8	0.5
AJ	28,922	164	482	2.7	2,096.7	2,096.7	2,097.1	0.4
AK	29,592	126	648	2.0	2,098.4	2,098.4	2,098.8	0.4
AL	30,537	320	1,313	1.0	2,099.5	2,099.5	2,100.0	0.5
AM	32,617	107	494	2.6	2,102.9	2,102.9	2,103.5	0.6
AN	33,572	86	545	2.4	2,104.4	2,104.4	2,105.2	0.8
AO	35,255	236	1,014	1.3	2,107.0	2,107.0	2,107.8	0.8
AP	37,630	185	753	1.4	2,111.2	2,111.2	2,111.9	0.7
AQ	38,485	106	515	2.0	2,112.9	2,112.9	2,113.6	0.7
AR	38,839	122	718	1.4	2,115.0	2,115.0	2,115.4	0.4
AS	39,829	59	323	3.2	2,116.9	2,116.9	2,117.8	0.9
AT	40,944	59	291	2.6	2,119.8	2,119.8	2,120.7	0.9
AU	41,774	116	615	1.2	2,121.0	2,121.0	2,121.9	0.9
AV	42,075	76	426	1.8	2,121.8	2,121.8	2,122.3	0.5
AW	43,000	51	273	2.8	2,123.4	2,123.4	2,124.1	0.7
AX	43,980	61	350	1.9	2,125.5	2,125.5	2,126.4	0.9
AY	44,398	56	355	1.9	2,126.6	2,126.6	2,127.4	0.8
AZ	44,968	46	146	3.2	2,128.0	2,128.0	2,128.9	0.9

---

[1] Feet Above Cross Section A

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

FLOODWAY DATA

SAND CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Sand Creek (Cont'd)								
BA	45,548	82	326	1.4	2,129.6	2,129.6	2,130.5	0.9
BB	46,523	29	132	3.6	2,132.4	2,132.4	2,133.2	0.9
BC	47,518	28	114	4.1	2,137.3	2,137.3	2,138.3	1.0
BD	48,218	48	215	2.2	2,139.4	2,139.4	2,140.1	0.7
BE	48,575	111	547	0.7	2,141.1	2,141.1	2,141.6	0.5
BF	49,195	136	520	0.7	2,141.5	2,141.5	2,142.0	0.5
BG	50,030	112	268	1.3	2,143.5	2,143.5	2,143.9	0.4

[1] Feet Above Cross Section A

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

FLOODWAY DATA

SAND CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Spring Creek								
A	940	71	343	2.8	2,131.6	2,129.7[2]	2,130.7[2]	1.0
B	1,225	57	233	4.1	2,134.1	2,132.2[2]	2,132.6[2]	0.4
C	1,875	47	273	3.5	2,138.5	2,136.8[2]	2,137.6[2]	0.8
D	2,185	40	249	3.8	2,141.7	2,138.7[2]	2,139.7[2]	1.0
E	2,475	68	308	3.1	2,141.7	2,141.0[2]	2,141.6[2]	0.6
F	2,680	31	188	5.0	2,142.7	2,142.7	2,143.5	0.8
G	2,820	62	398	2.4	2,143.6	2,143.6	2,144.5	0.9
H	3,495	27	168	5.7	2,150.4	2,150.4	2,151.3	0.9
I	4,060	54	356	2.7	2,153.9	2,153.9	2,154.6	0.7
J	4,460	61	234	4.1	2,157.0	2,157.0	2,157.5	0.5
K	4,660	58	264	3.6	2,159.0	2,159.0	2,159.5	0.5
L	4,890	67	344	2.8	2,160.3	2,160.3	2,160.7	0.4
M	5,040	74	373	2.5	2,161.0	2,161.0	2,161.6	0.6
N	5,380	56	253	3.8	2,162.3	2,162.3	2,162.8	0.5
O	5,505	60	270	3.5	2,162.8	2,162.8	2,163.4	0.6
P	5,840	59	502	1.9	2,167.9	2,167.9	2,168.4	0.5
Q	6,400	259	1,015	0.9	2,173.3	2,173.3	2,173.7	0.4
R	6,730	84	177	5.4	2,177.8	2,177.8	2,178.1	0.3
S	7,025	103	346	2.7	2,180.8	2,180.8	2,181.1	0.3
T	7,298	186	468	2.0	2,185.2	2,185.2	2,185.4	0.2
U	7,488	97	256	3.7	2,186.5	2,186.5	2,186.7	0.2
V	7,748	147	547	1.7	2,187.4	2,187.4	2,187.6	0.2
W	7,943	192	461	2.1	2,188.3	2,188.3	2,188.9	0.6
X	8,273	99	323	2.9	2,191.3	2,191.3	2,192.1	0.8
Y	9,073	71	283	3.4	2,199.8	2,199.8	2,200.7	0.9
Z	9,573	77	365	2.6	2,203.1	2,203.1	2,203.8	0.7

[1] Feet Above Mouth [2] Elevation Computed Without Consideration of Control by Lightning Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

FLOODWAY DATA

SPRING CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Spring Creek (Cont'd)								
AA	10,113	80	206	4.1	2,210.1	2,210.1	2,210.2	0.1
AB	10,748	113	360	2.4	2,215.5	2,215.5	2,216.4	0.9
AC	11,178	64	236	3.6	2,218.5	2,218.5	2,219.5	1.0
AD	11,558	83	219	3.9	2,222.2	2,222.2	2,223.2	1.0
AE	12,063	43	224	3.8	2,226.6	2,226.6	2,227.4	0.8
AF	12,503	37	177	4.8	2,230.2	2,230.2	2,231.1	0.9
AG	13,088	98	298	2.9	2,237.6	2,237.6	2,238.6	1.0
AH	13,568	49	175	4.9	2,246.0	2,246.0	2,246.5	0.5
AI	13,918	110	264	3.2	2,251.2	2,251.2	2,251.4	0.2

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[1] Feet Above Mouth

BEST COPY

TABLE 3

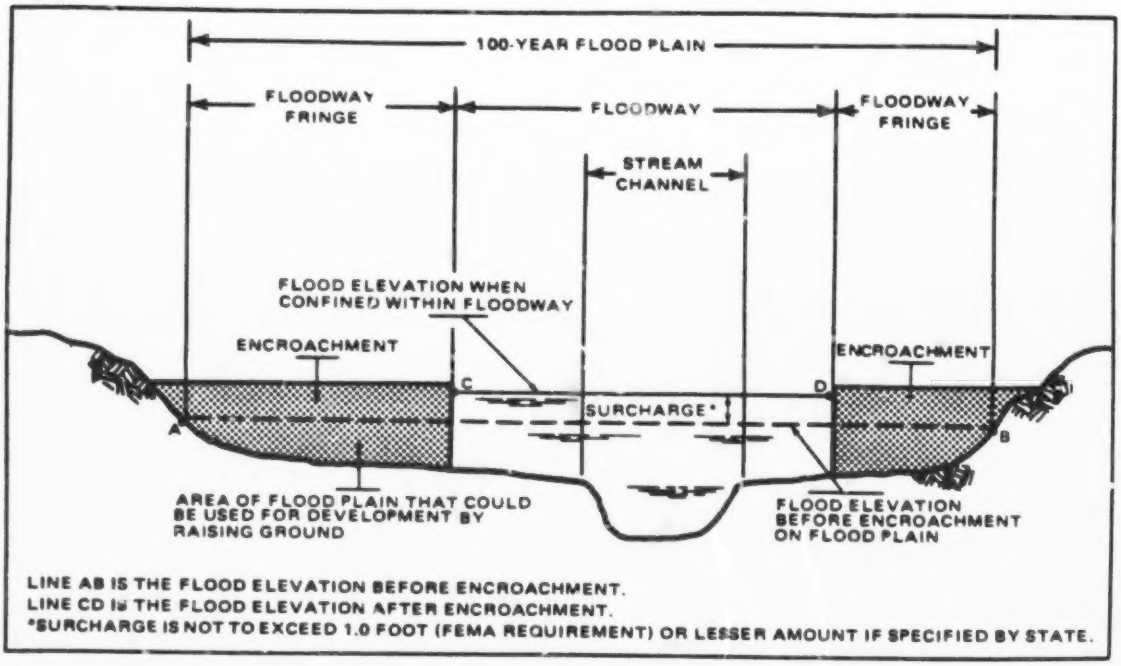
FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

FLOODWAY DATA

SPRING CREEK

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 2.


100-YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN

LINE AB IS THE FLOOD ELEVATION BEFORE ENCROACHMENT.
LINE CD IS THE FLOOD ELEVATION AFTER ENCROACHMENT.
*SURCHARGE IS NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

Figure 2. Floodway Schematic

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the Federal Emergency Management Agency has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors, and flood insurance zone designations for each flooding source studied in detail affecting Bonner County.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods.

This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach:

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet
More than 12 feet	3.0 feet

The locations of the reaches determined for the flooding sources of Bonner County are shown on the Flood Profiles (Exhibit 1) and summarized in Table 4.

5.2 Flood Hazard Factors

The Flood Hazard Factor (FHF) is the Federal Emergency Management Agency device used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHF are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest one-half foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire unincorporated area of Bonner County was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

Zone A:	Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations shown or FHFs determined.
Zones A1-A10:	Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to FHFs.

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION[3] (FEET NGVD)
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
Clark Fork							
Reach 1	0430	-2.9	-0.7	1.5	030	A6	Varies - See Map
Reach 2	0430	-2.6	-0.7	1.4	025	A5	Varies - See Map
Reach 3	0430,0440 0445	-3.9	-1.0	2.0	040	A8	Varies - See Map
Reach 4	0445	-5.0	-1.3	2.6	050	A10	Varies - See Map
Grouse Creek							
Reach 1	0205	-2.1	-0.7	1.4	020	A4	Varies - See Map
Reach 2	0205	-0.9	-0.3	0.6	010	A2	Varies - See Map
Lightning Creek							
Reach 1	0340,0430	-1.2	-0.4	0.8	010	A2	Varies - See Map
Pack River							
Reach 1	0215	-3.3	-1.0	2.1	035	A7	Varies - See Map
Reach 2	0215	-4.7	-1.3	2.6	045	A9	Varies - See Map
Reach 3	0185,0205	-3.0	-0.9	2.2	030	A6	Varies - See Map
Reach 4	0185	-2.4	-0.8	1.8	025	A5	Varies - See Map
Reach 5	0095,0185	-1.7	-0.6	1.1	015	A3	Varies - See Map
Priest River							
Reach 1	0270	-1.1	-0.3	0.6	010	A2	Varies - See Map
Reach 2	0260	-1.0	-0.3	0.5	010	A2	Varies - See Map
Reach 3	0155,0160 0170	-0.9	-0.3	0.5	010	A2	Varies - See Map
Lake Cocolalla	0400	-3.1	N/A	N/A	030	A6	2212
Lake Kelso	0500	-0.4	N/A	N/A	005	A1	2154

[1] Flood Insurance Rate Map Panel [2] Weighted Average [3] Rounded to Nearest Foot

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

CLARK FORK-GROUSE CREEK-LIGHTNING CREEK-PACK RIVER-PRIEST RIVER-
LAKE COCOLALLA-LAKE KELSO

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1% (100 - YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION[3] (FEET NGVD)
		10% (10 - YEAR)	2% (50 - YEAR)	0.2% (500 - YEAR)			
Lake Pend Oreille (Stillwater)	0215,0220 0325,0360 0375,0400	-5.8	N/A	N/A	060	A12	2070
Lake Pend Oreille (Wave)	0285,0300 0325,0425	-7.4	N/A	N/A	075	A15	2071[4]
Rapid Lightning Creek							
Reach 1	0215	-1.0	-0.3	0.6	010	A2	Varies - See Map
Reach 2	0215,0220	-2.0	-0.7	1.3	020	A4	Varies - See Map
Reach 3	0220	-1.3	-0.4	0.7	015	A3	Varies - See Map
Sand Creek North							
Reach 1	0205	-1.1	-0.4	0.8	010	A2	Varies - See Map
Sand Creek							
Reach 1	0195,0285	-1.5	-0.5	1.0	015	A3	Varies - See Map
Spring Creek							
Reach 1	0340,0430	-0.9	-0.3	0.6	010	A2	Varies - See Map
Pend Oreille River							
Reach 1	0215,0270 0285,0300 0360,0375 0400	-5.8	N/A	N/A	060	A12	Varies - See Map

[1] Flood Insurance Rate Map Panel [2] Weighted Average [3] Rounded to Nearest Foot

[4] Includes Wave Height Above Stillwater Elevation

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY ID
(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

LAKE PEND OREILLE (STILLWATER)-LAKE PEND OREILLE (WAVE)-RAPID LIGHTNING CREEK
SAND CREEK NORTH-SAND CREEK-SPRING CREEK-LAKE PEND OREILLE (PEND OREILLE RIVER)

Zone B: Areas between the Special Flood Hazard Areas and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water-control structure; also areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.

Zone C: Areas of minimal flooding.

The flood elevation differences, FHFs, flood insurance zones, and base flood elevations for each flooding source studied in detail in the county are summarized in Table 4.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for Bonner County is, for insurance purposes, the principal result of the Flood Insurance Study. This map (published separately) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the Federal Emergency Management Agency.

6.0 OTHER STUDIES

A Special Flood Hazard Information report for Pack River was prepared in August 1973 by the U.S. Army Corps of Engineers, Seattle District (Reference 5). The report contains water-surface profiles and flood boundary maps for the lower 7 river miles and estimated flood plain boundaries for the upper 14 miles of study. The entire study reach extends from State Highway 200 upstream to U.S. Highway 95.

With a request from the U.S. Army Corps of Engineers and agreement by the Federal Emergency Management Agency, the hydrology was recalculated and the resultant values were used for calculation of water-surface profiles. The hydrologic and hydraulic calculations for this Flood Insurance Study do not agree with the older U.S. Army Corps of Engineers report and, therefore, supersede it. Cross sections previously surveyed by the U.S. Army Corps of Engineers were used for the area below Rapid Lightning Creek Road.

Flood Insurance Studies for the Cities of Clark Fork, East Hope, Hope, Ponderay, Priest River, and Sandpoint and Kootenai County are either being prepared or published (References 21 through 28). The data as presented in these separate studies will agree exactly with data presented in the Bonner County study.

This study is authoritative for the purposes of the National Flood Insurance Program; data presented herein either supersede or are compatible with all previous determinations.

7.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, Federal Emergency Management Agency, Federal Regional Center, 130 228th Street, SW., Bothell, Washington 98011.

8.0 BIBLIOGRAPHY AND REFERENCES

1. State of Idaho, Division of Tourism and Industrial Development, Idaho Almanac, R. E. Hammond, Boise, Idaho, 1977

2. State of Idaho, Water Resources Board, Interim State Water Plan, Boise, Idaho, July 1972

3. State of Idaho, Department of Water Resources, Technical and Support Information for the Panhandle River Basins, State Water Plan, Part Two, July 1976

4. U.S. Department of the Interior, Geological Survey, in cooperation with Idaho Department of Water Administration, Water Information Bulletin 35, Ground Water Occurrence and Movement in the Athol Area and the Northern Rathdrum Prairie, Northern Idaho, Boise, Idaho, March 1974

5. U.S. Department of the Army, Corps of Engineers, Seattle District, Special Flood Hazard Information, Pack River, Bonner County, Idaho, State of Idaho, Boise, Idaho, August 1973

6. Sandpoint Daily Bee, Sandpoint, Idaho, January 1974

7. Sandpoint News-Bulletin, Sandpoint, Idaho, January 17, 1974

8. Bonner County Planning and Zoning Commission, Bonner County Comprehensive Plan, 1978

9. U.S. Department of the Interior, Geological Survey, Water-Supply Paper 1316, Compilation of Records of Surface Waters of the United States Through September 1950, Part 12, 1955

10. U.S. Department of the Interior, Geological Survey, Water-Supply Paper 1736, Compilation of Records of Surface Waters of the United States October 1950 to September 1960, Part 12, 1964

11. U.S. Department of the Interior, Geological Survey, Water-Supply Paper 1933, Surface Water Supply of the United States, 1961-65, Part 12, 1971

12. U.S. Department of the Interior, Geological Survey, Water Resources Data for Idaho Water Years 1965 Through 1975, 1965 Through 1976, 11 Volumes

13 U.S. Water Resources Council, "Guidelines for Determining Flood Flow Frequency," Bulletin 17, March 1976

14. U.S. Department of the Army, Corps of Engineers, Hydrologic Engineering Center, Computer Program HEC-1 Flood Hydrograph Package, Users Manual, Davis, California, January 1973

15. U.S. Department of the Army, Corps of Engineers, Hydrologic Engineering Center, Computer Program 723-X6-6202A HEC-2 Water-Surface Profiles, Users Manual, Davis, California, October 1973, Updated October 1976

16. CH2M Hill, Inc., Aerial Photographs, Clark Fork River, Scale 1:14,400 and Scale 1:4,800, November 1977 and September 1981; Grouse Creek, Scale 1:14,400, November 1977; Lightning Creek, Scale 1:14,400, November 1977; Mosquito Creek, Scale 1:14,400, November 1977; Pack River, Scale 1:14,400, November 1977 and September 1981; Priest River, Scale 1:12,000, November 1977 and September 1981; Rapid Lightning Creek, Scale 1:14,400, November 1977; Sand Creek, Scale 1:12,000, November 1977; Sand Creek North, Scale 1:14,400, November 1977; Spring Creek, Scale 1:14,400, November 1977

17. U.S. Department of the Army, Office of the Chief of Engineers, Wave Runup and Wind Setup on Reservoir Embankments, November 1976

18. U.S. Department of the Army, Corps of Engineers, Coastal Engineering Research Center, Shore Protection Manual, Three Volumes, 1973

19. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Bonner County, Idaho, Scale 1:24,000, 1977

20. U.S. Department of the Interior, Geological Survey, 7.5-Minute Series Topographic Maps, Scale 1:24,000, Contour Intervals 20 and 40 feet: Careywood, Idaho (1968); Cocolalla, Idaho (1968); Happy Fork Gap, Idaho (1968); Laclede, Idaho (1968); Morton, Idaho (1968); Priest River, Idaho (1968); Sagle, Idaho (1968); Sandpoint, Idaho (1968)

21. U.S. Department of the Interior, Geological Survey, 15-Minute Series Topographic Maps, Scale 1:62,500, Contour Interval 40 feet: Elmira, Idaho (1951); Packsaddle Mountain, Idaho (1949)

22. Federal Emergency Management Agency, Flood Insurance Study, City of Clark Fork, Idaho, unpublished

23. Federal Emergency Management Agency, Flood Insurance Study, City of East Hope, Idaho, unpublished

24. Federal Emergency Management Agency, Flood Insurance Study, City of Hope, Idaho, unpublished

25. Federal Emergency Management Agency, Flood Insurance Study, City of Ponderay, Idaho, unpublished

26. Federal Emergency Management Agency, Flood Insurance Study, City of Priest River, Idaho, February 1982

27. Federal Emergency Management Agency, Flood Insurance Study, City of Sandpoint, Idaho, February 1982

28. Federal Emergency Management Agency, Flood Insurance Study, Kootenai County, Idaho (Unincorporated Areas), unpublished

American Society of Civil Engineers, "Distribution of Extreme Winds in the United States," H. C. S. Thom, Journal of the Structural Division, April 1960

American Society of Civil Engineers, "Distribution of Extreme Winds in the United States," H. C. S. Thom, Journal of the Structural Division, July 1, 1968

Idaho Department of Water Resources, Population and Employment Forecast, State of Idaho, July 1976

State of Idaho, Bureau of Disaster Services, Hazard Analysis Summary Report, 1976

State of Idaho, Bureau of Disaster Services, Historical Information for Flood Hazard Analysis Panel, 1976

State of Idaho, Department of Water Resources, et al., Idaho Environmental Overview, November 1975

State of Idaho, Department of Water Resources, Draft State Water Plan, Panhandle River Basins Technical and Support Information, July 1976

U.S. Department of the Army, Corps of Engineers, North Pacific Division, Snow Hydrology, June 1956

U.S. Department of the Army, Corps of Engineers, Seattle District, Seattle, Washington, Metropolitan Spokane Region Study

U.S. Department of the Interior, Geological Survey, Basic Data Release, *Miscellaneous Streamflow Measurements in Idaho 1894-1967*, 1970

U.S. Department of the Interior, Geological Survey, Water Resources Investigations 7-73, *Magnitude and Frequency of Floods in Small Drainage Basins in Idaho*, April 1973

U.S. Department of the Interior, Geological Survey, Water-Supply Paper 1866-A, *Floods of December 1964 and January 1965 in the Far Western States*, 1971

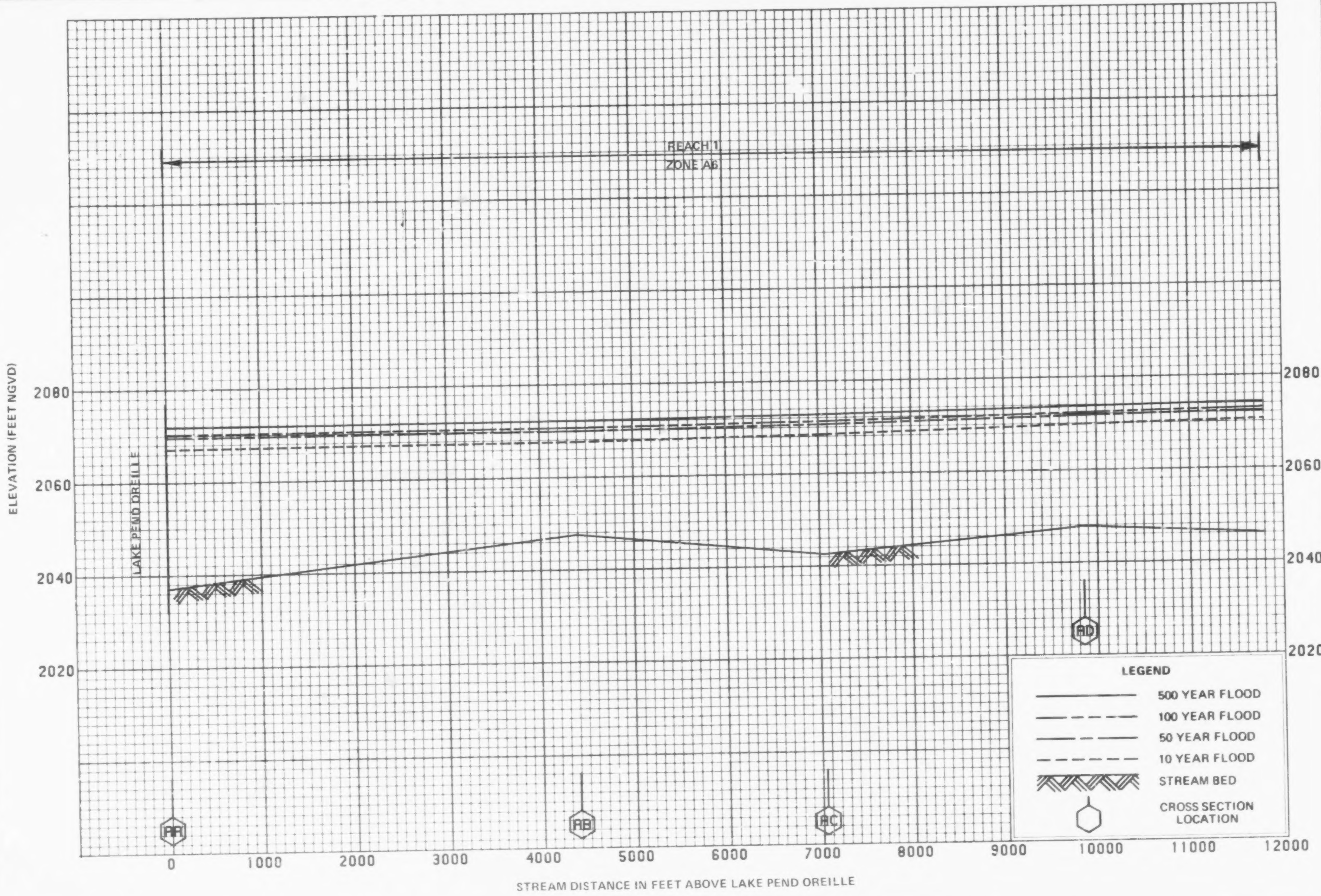
9.0 REVISIONS DESCRIPTION

This section has been added to provide information regarding significant revisions made since the original Flood Insurance Study (FIS) was printed. Future revisions may be made that do not result in the republishing of the FIS report. To assure that any user is aware of all revisions, it is advisable to contact the community repository of flood hazard data located at the Bonner County Department of Public Works, 215 South First Street, Sandpoint, Idaho 83864.

9.1 First Revision

This study was revised August 4, 1987 to incorporate a detailed analysis of the Pend Oreille River. The revision was based on a 100-year backwater profile prepared by the Seattle District of the U.S. Army Corps of Engineers (COE). The COE's profile shows a draw down of the 100-year water-surface elevation of the Pend Oreille River from Albeni Falls Dam to Lake Pend Oreille at Sandpoint, Idaho. A profile of the 100-year water-surface elevation for this reach of the Pend Oreille River is shown on Exhibit 1, Panels 57P-59P of this study.

The Flood Insurance Studies for Sandpoint, Idaho and Priest River, Idaho have also been revised to reflect the updated 100-year water-surface elevations and corporate limit changes, and therefore, are in exact agreement with this study.



FLOOD PROFILES

CLARK FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

01P

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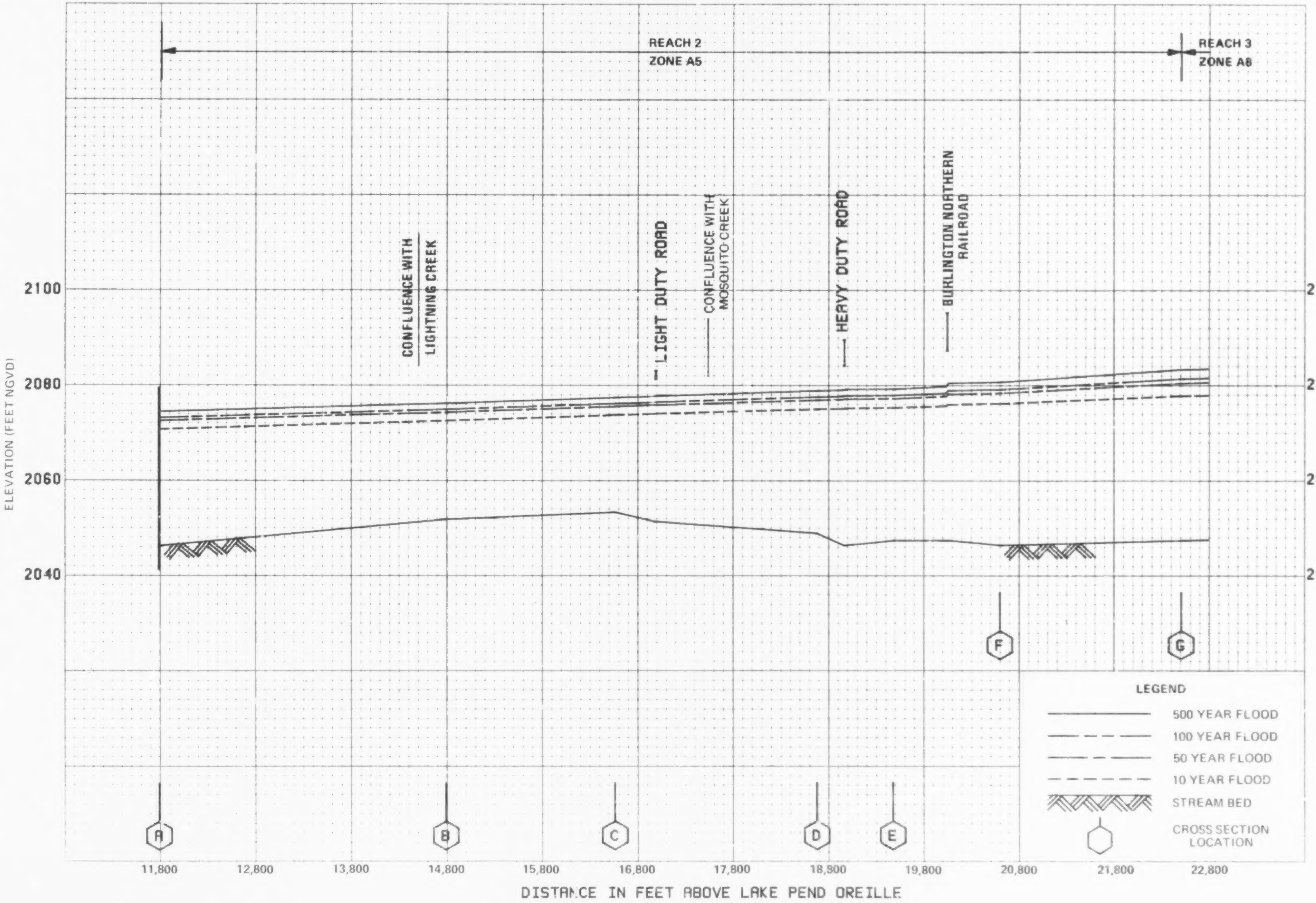


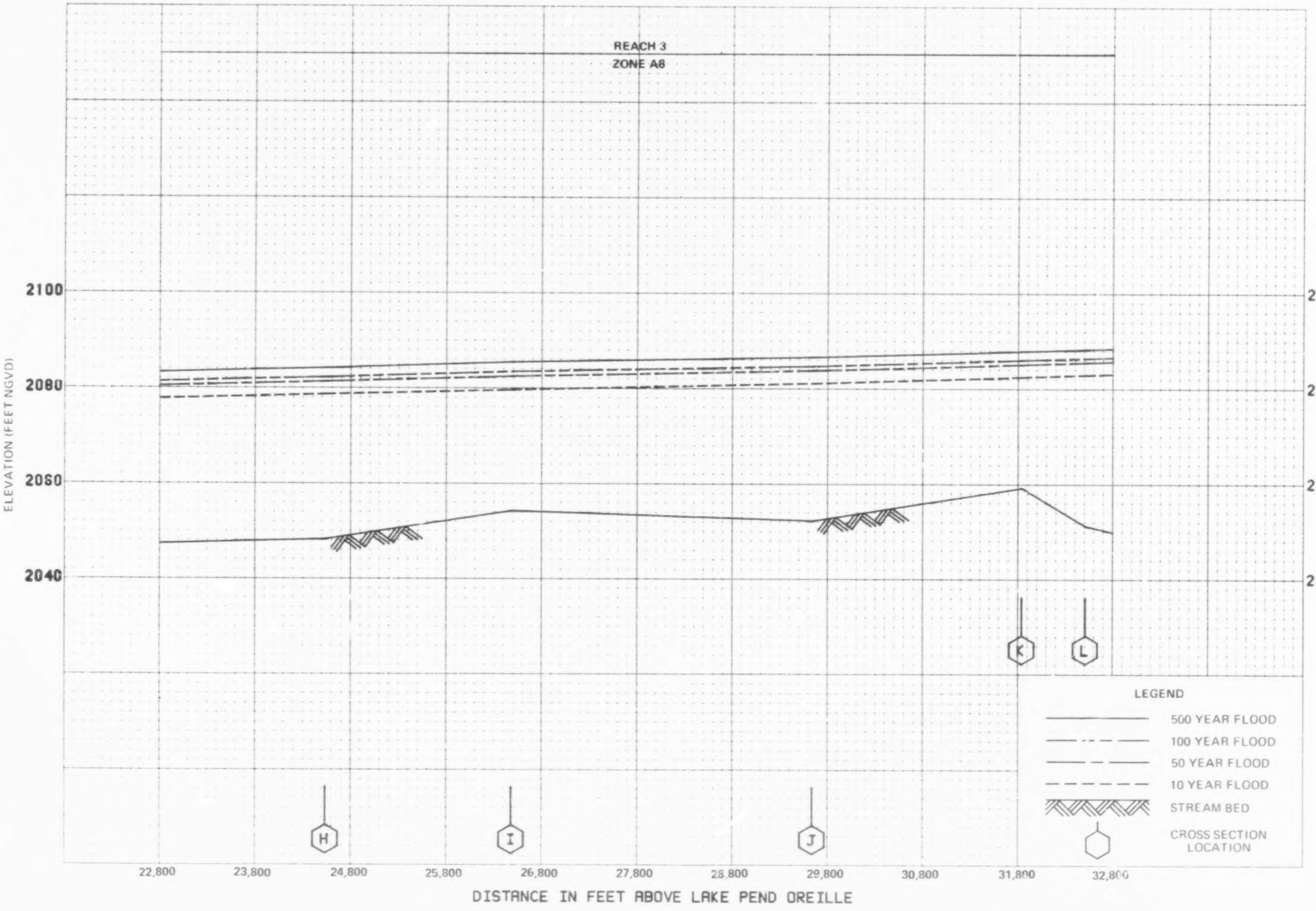
FLOOD PROFILES

CLARK FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

02P



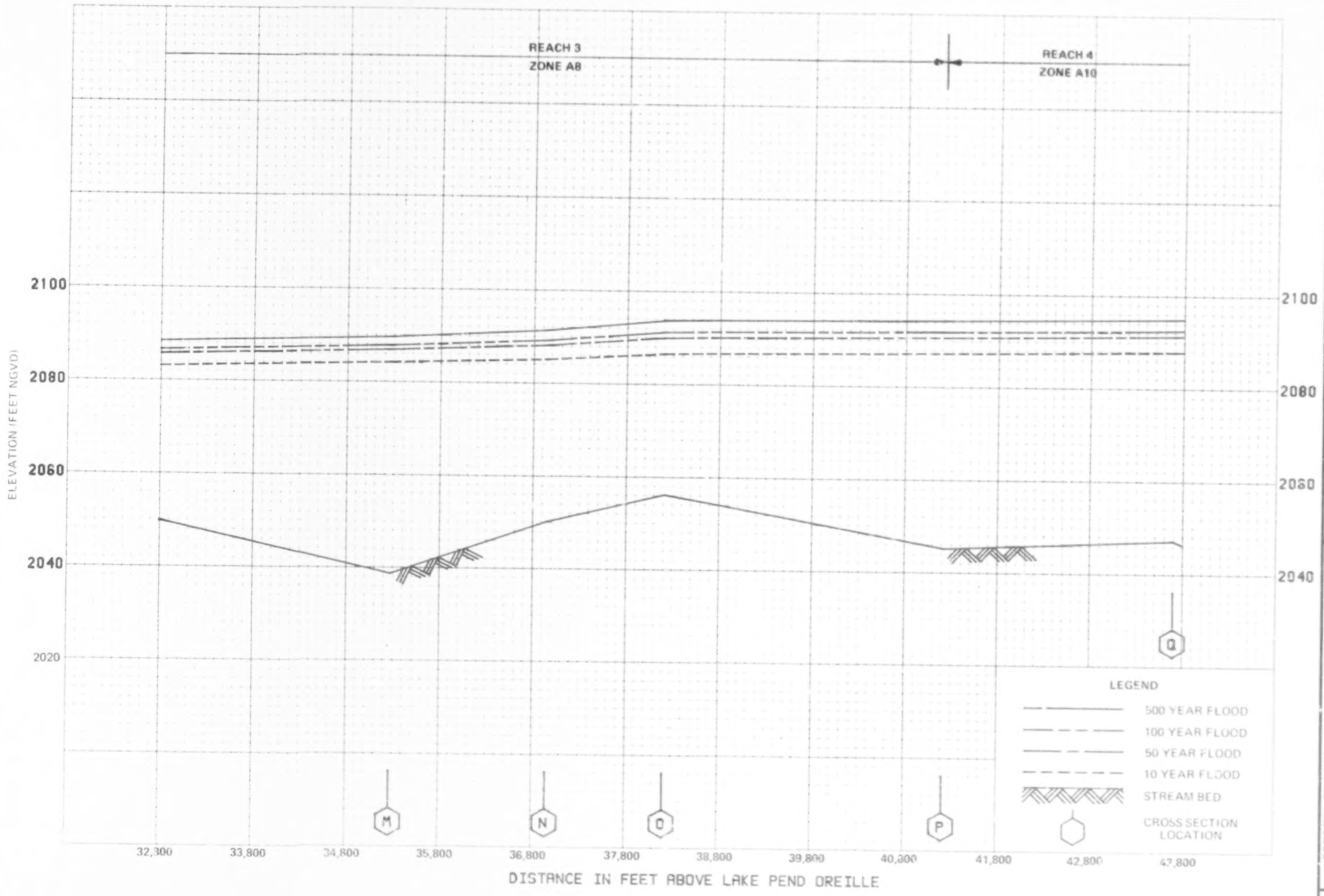
FLOOD PROFILES

CLARK FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

03P



FLOOD PROFILES

CLARK FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

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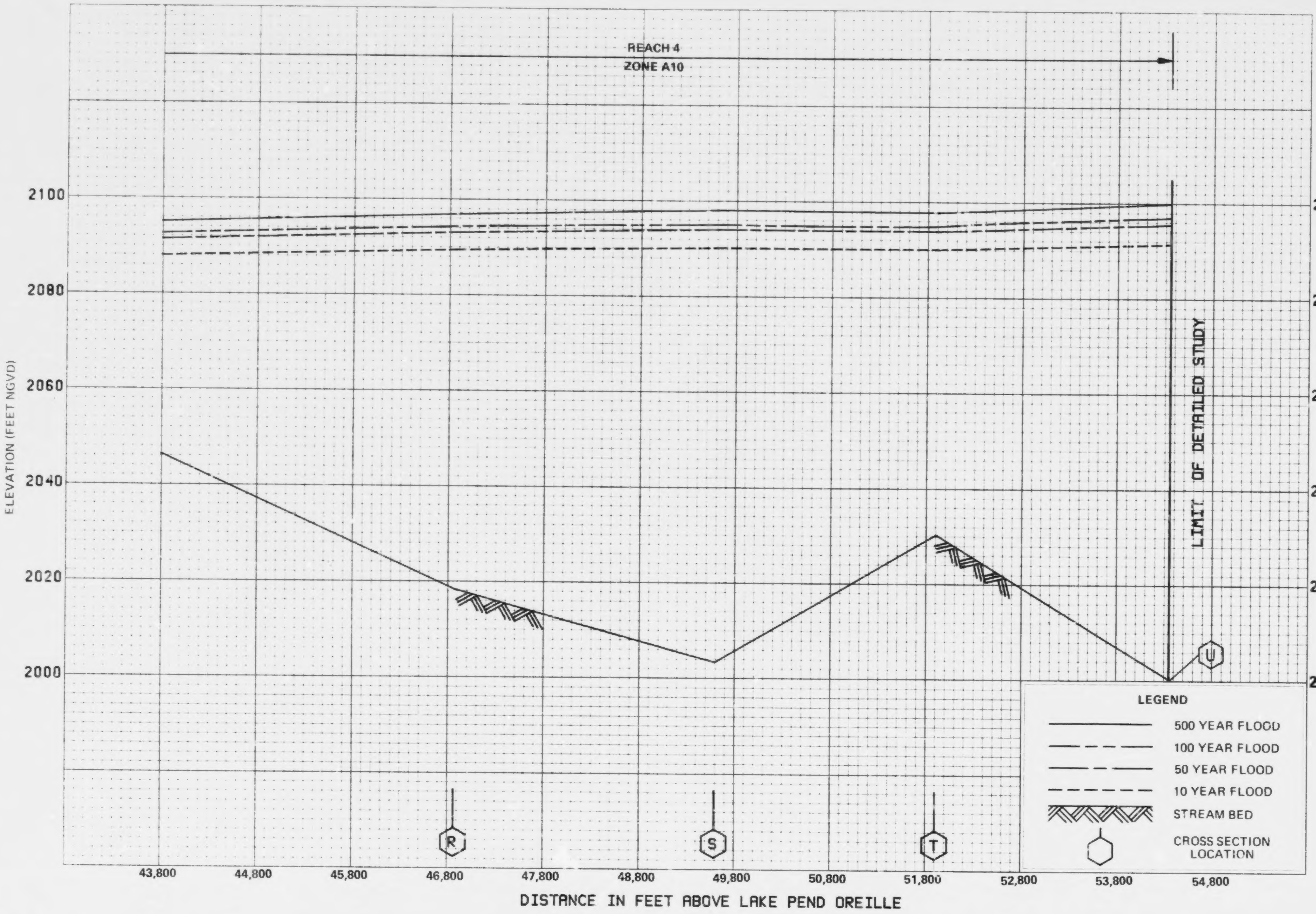


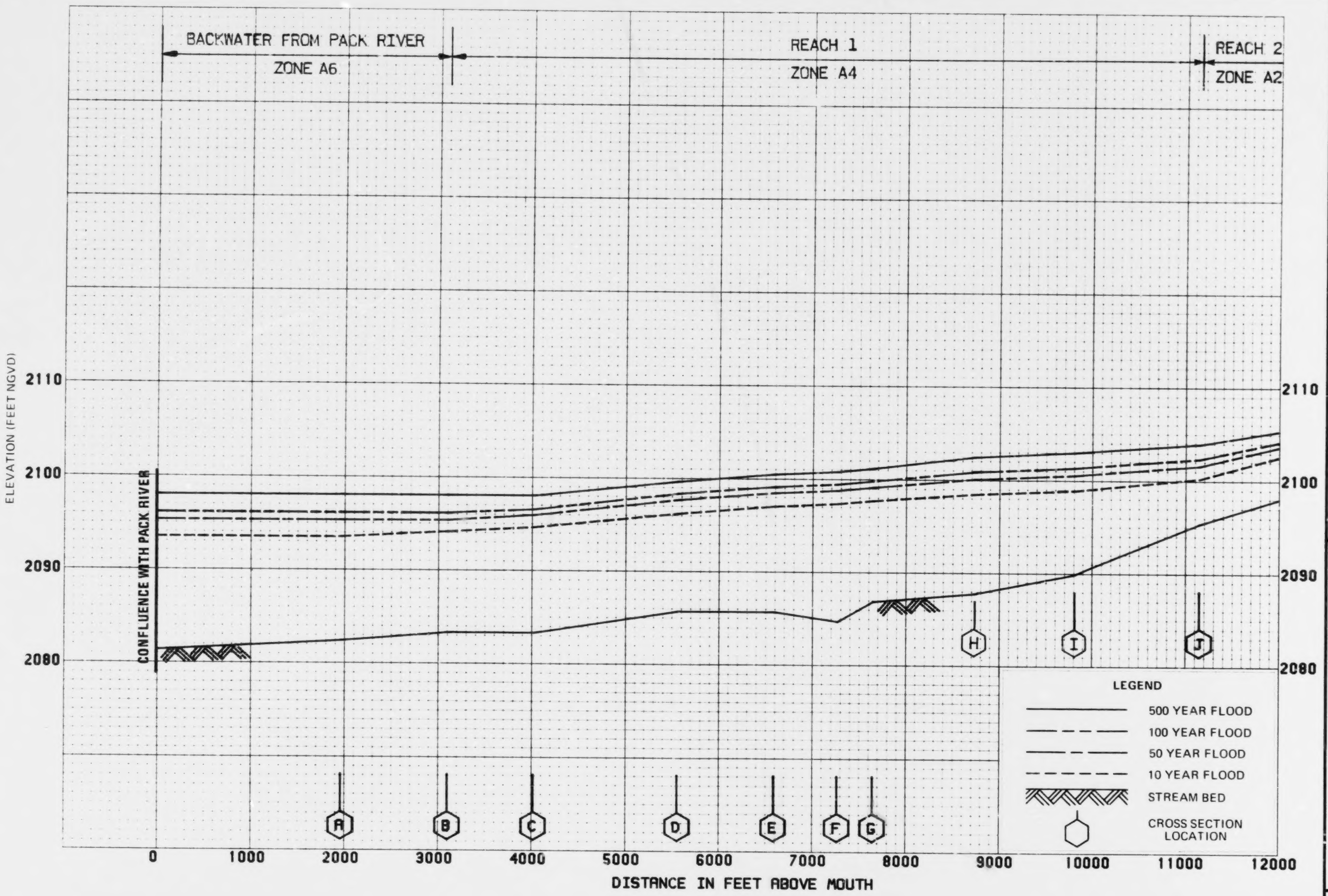
FLOOD PROFILES

CLARK FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

05P



FLOOD PROFILES

GROUSE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

06P

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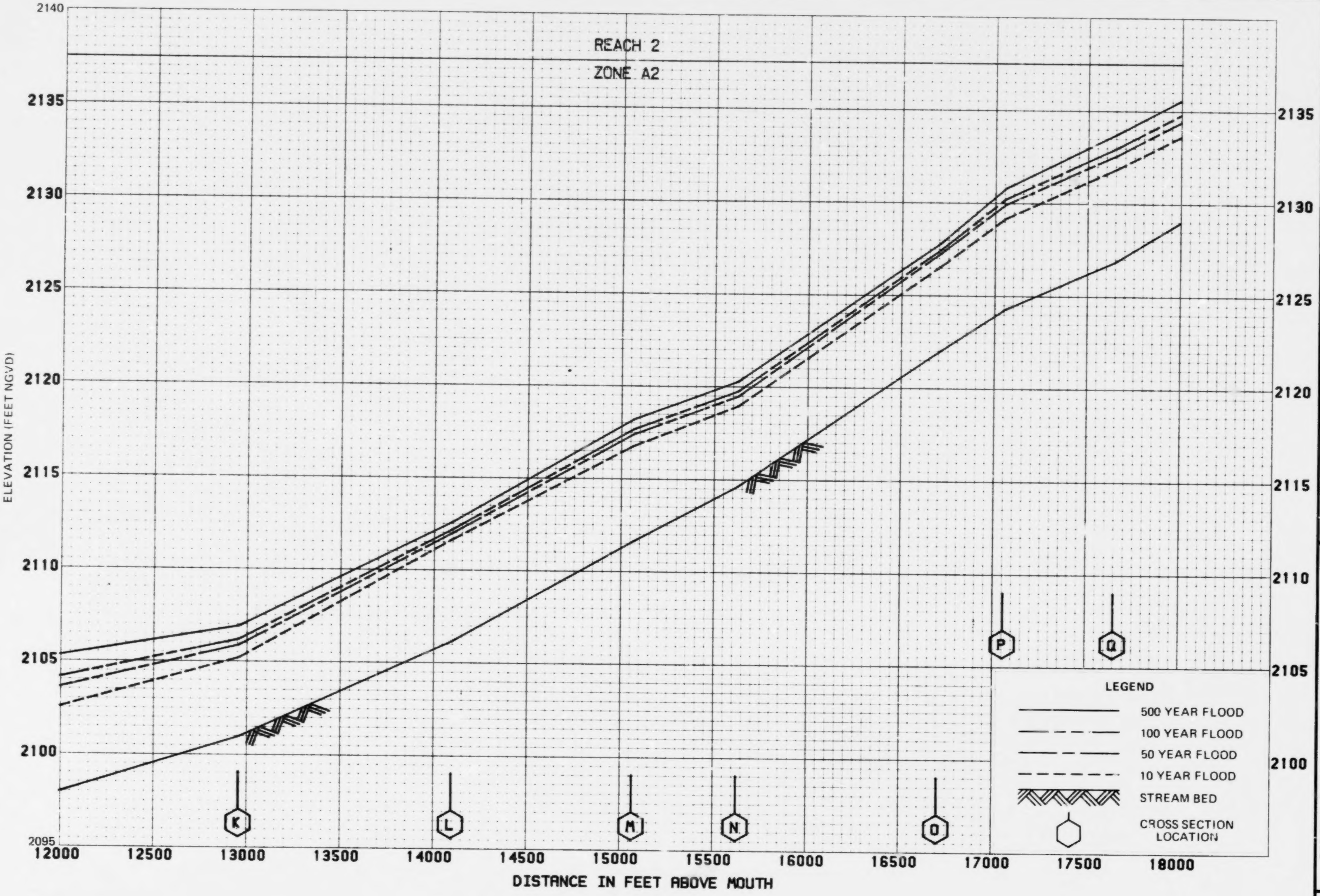

FLOOD PROFILES

GROUSE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

07P

62

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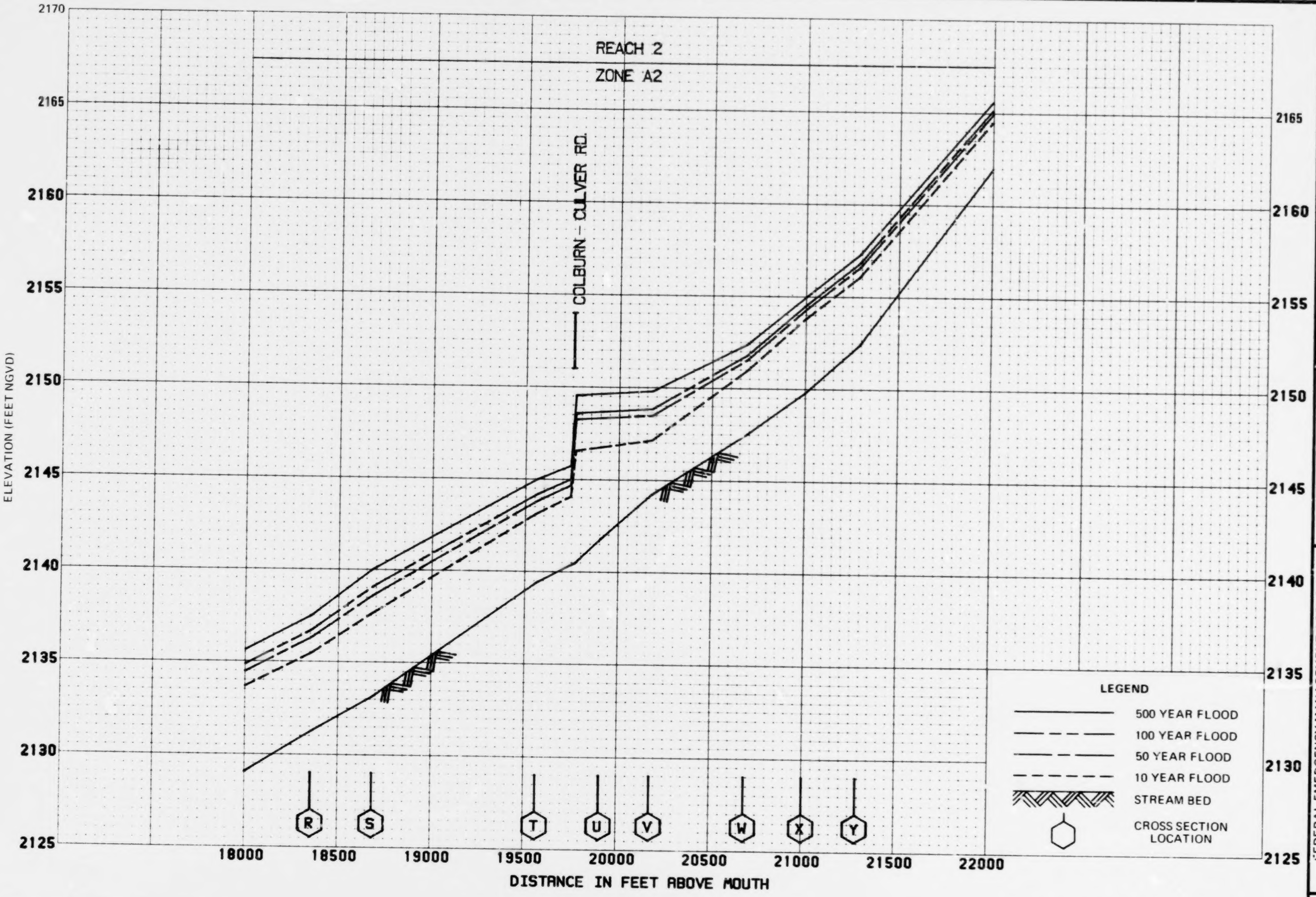

FLOOD PROFILES

GROUSE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

08P

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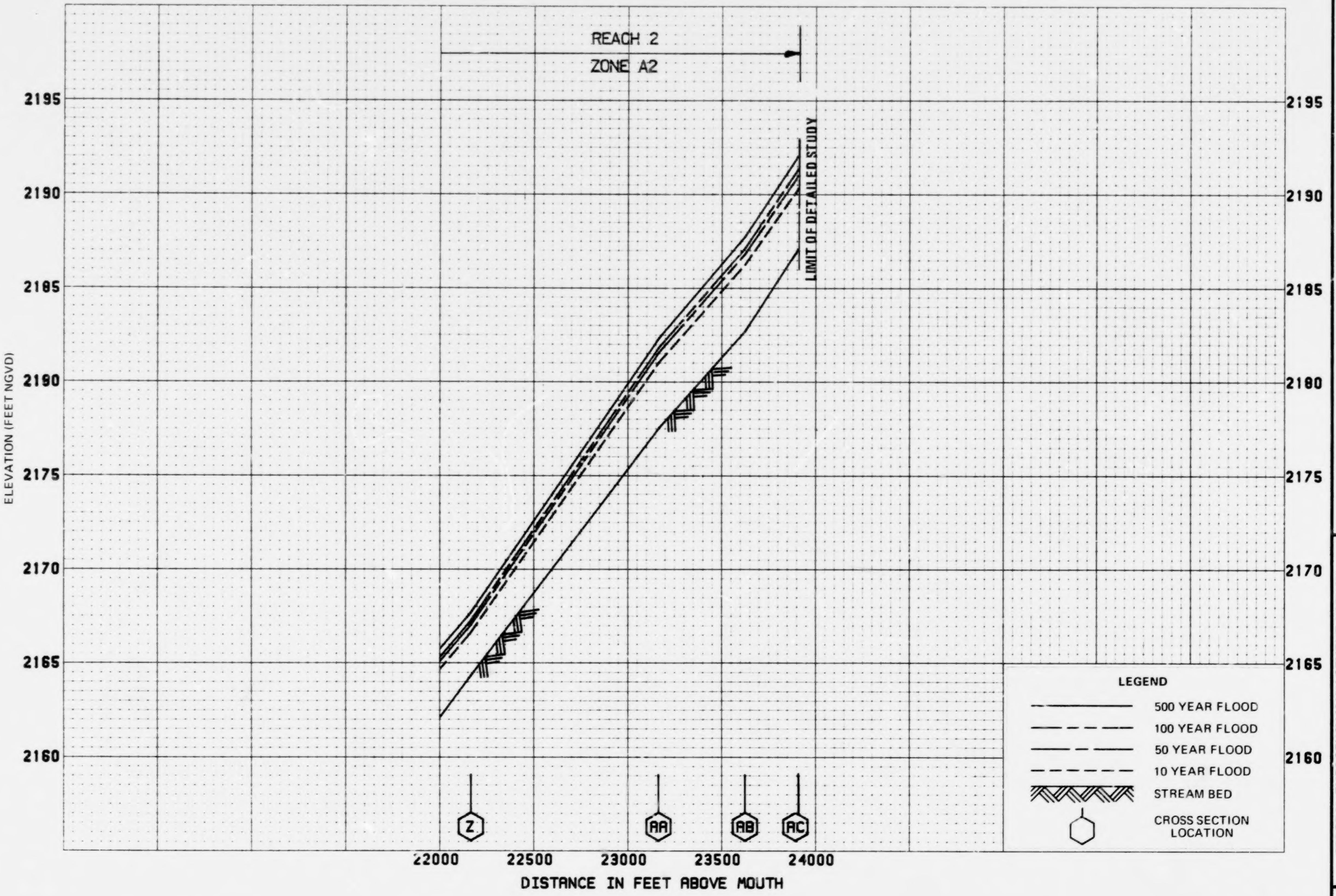


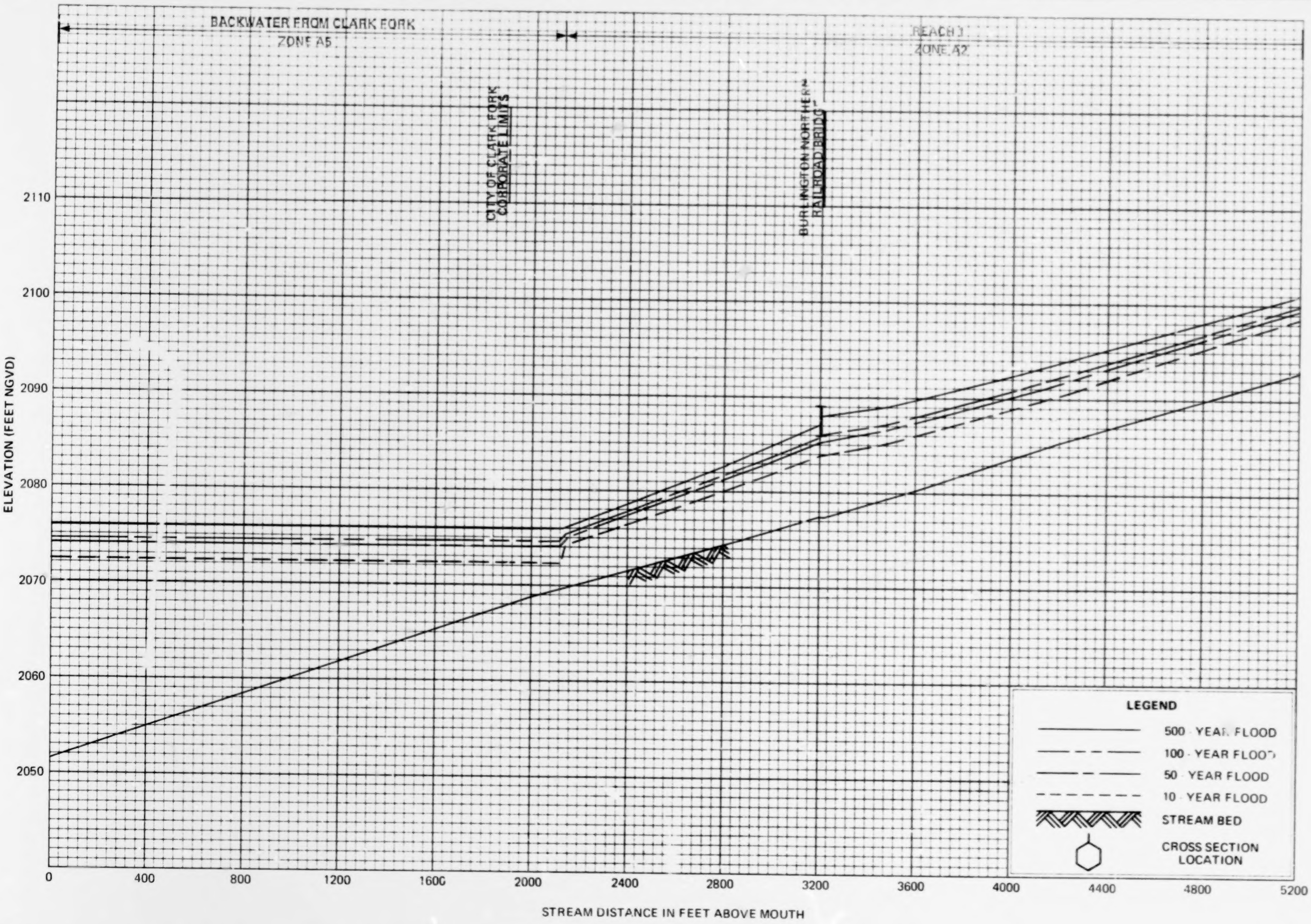
FLOOD PROFILES

GROUSE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

09P



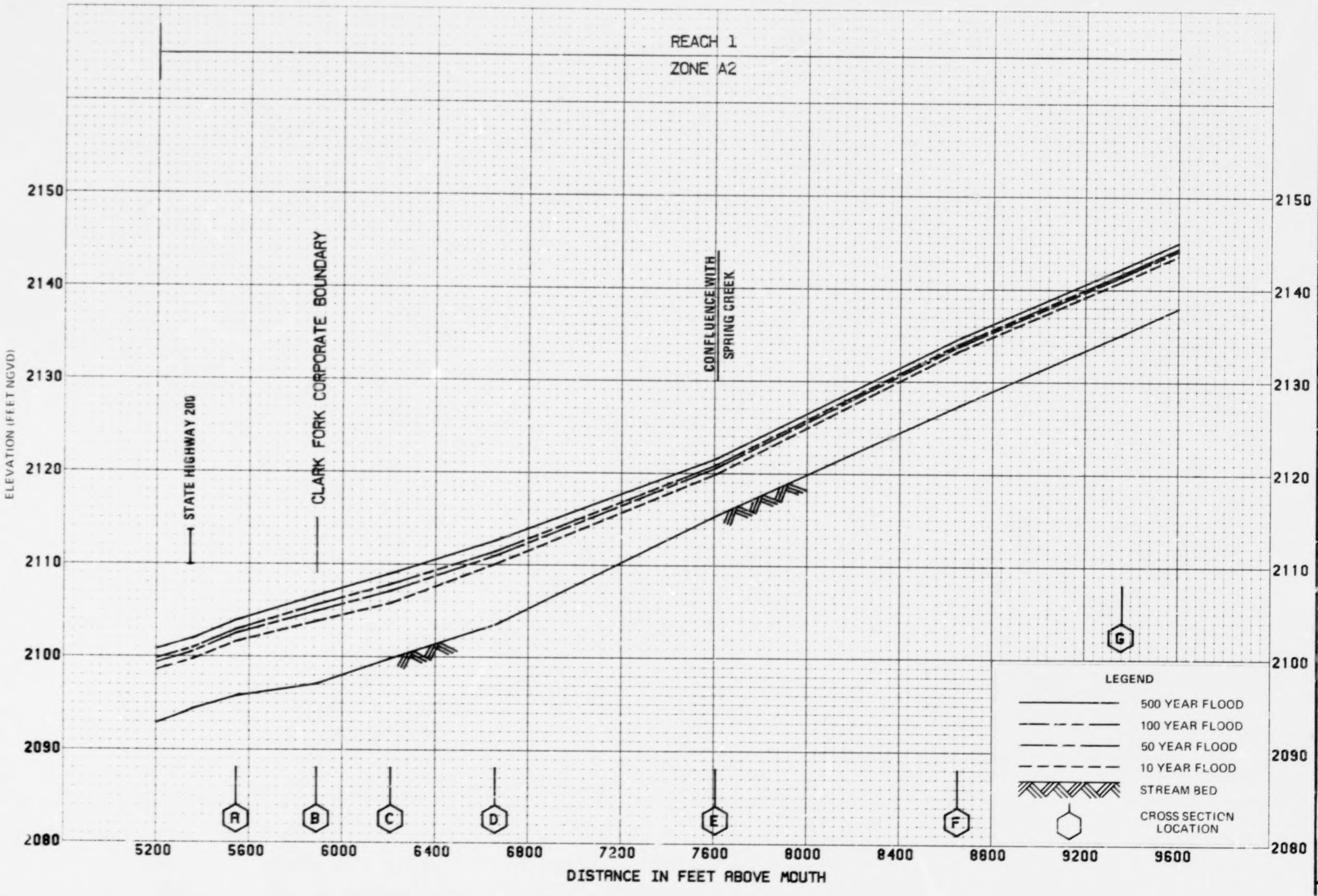
FLOOD PROFILES

LIGHTNING CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

10P



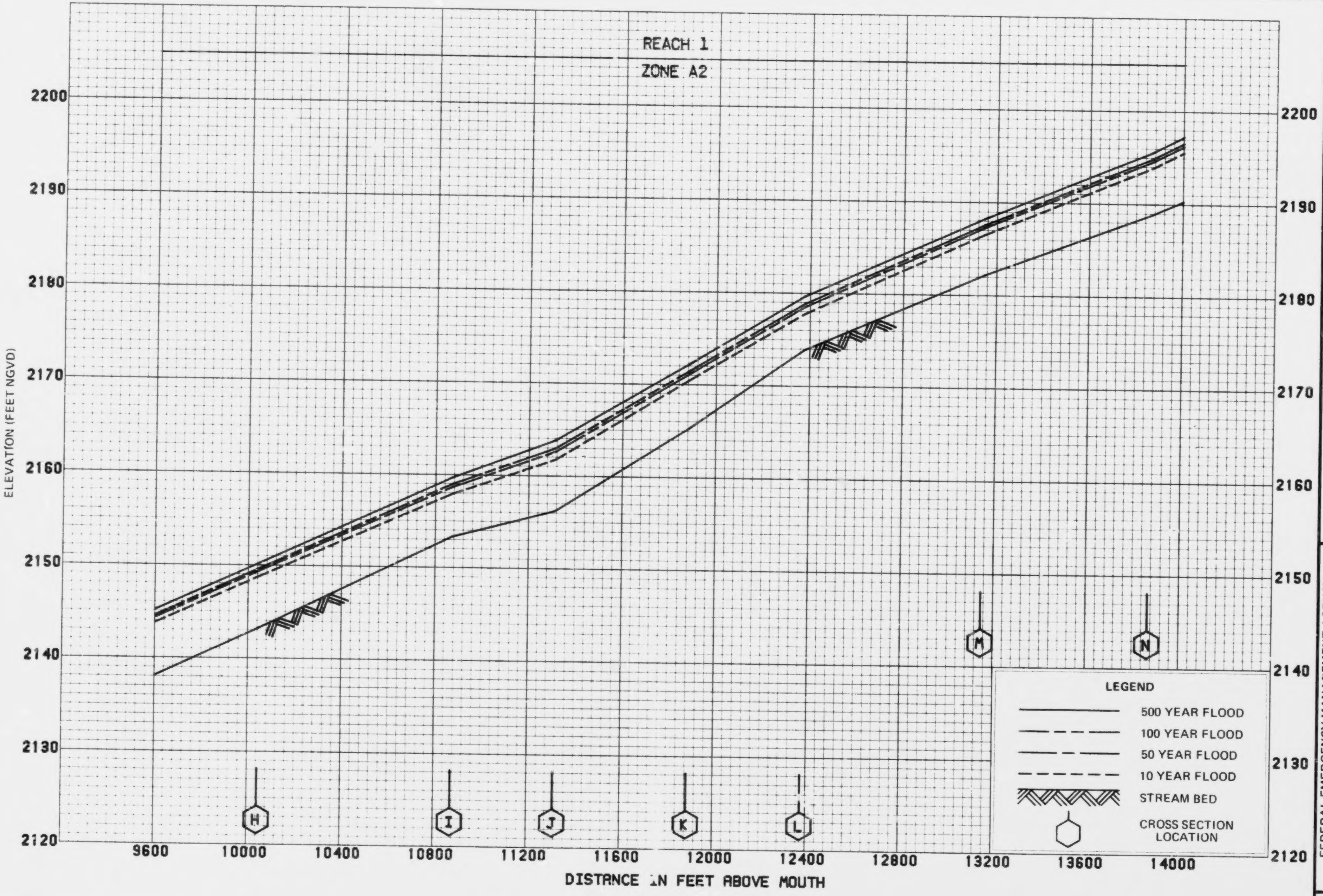
FLOOD PROFILES

LIGHTNING CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

11P



FLOOD PROFILES

LIGHTNING CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

12P

67

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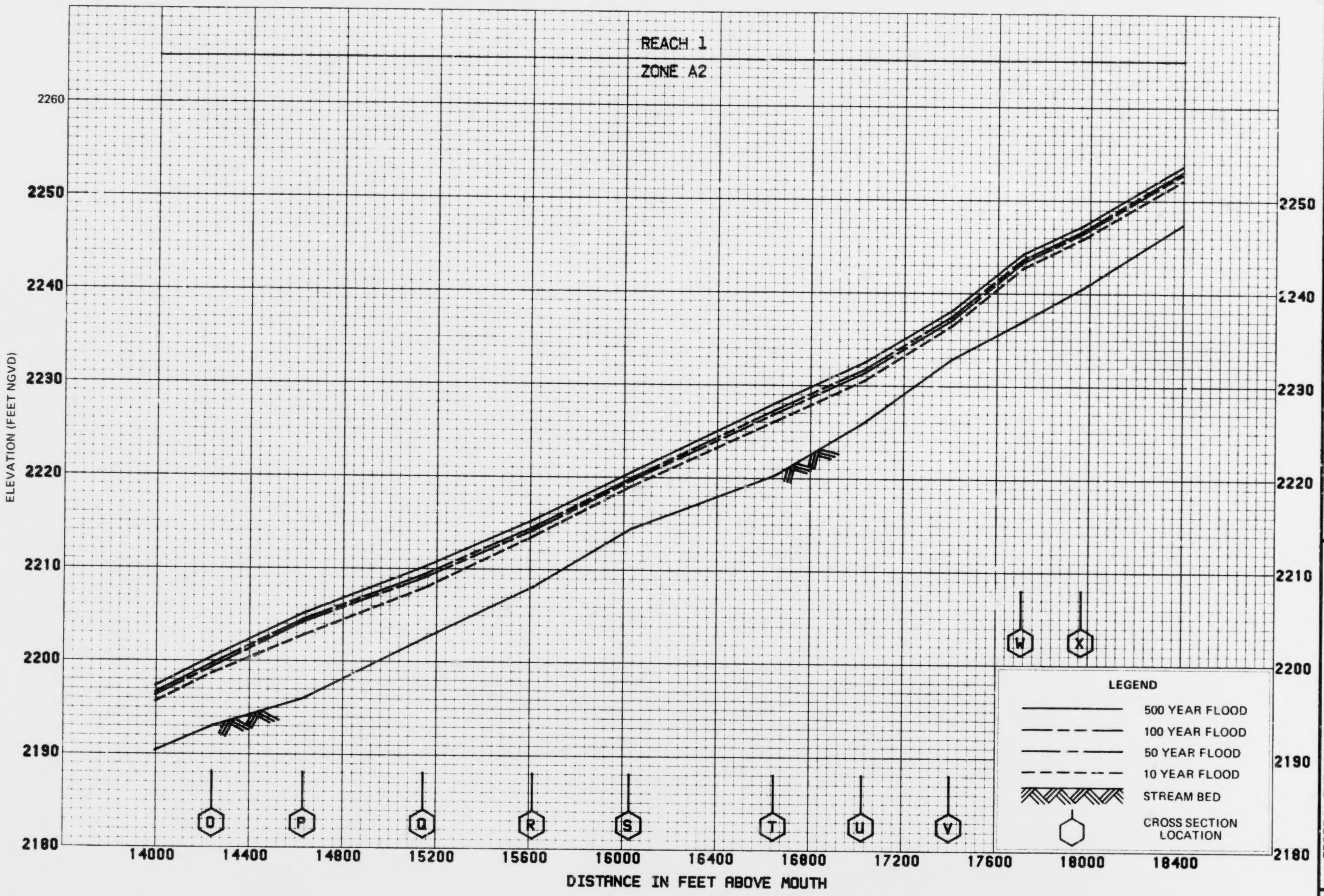

FLOOD PROFILES

LIGHTNING CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

13P

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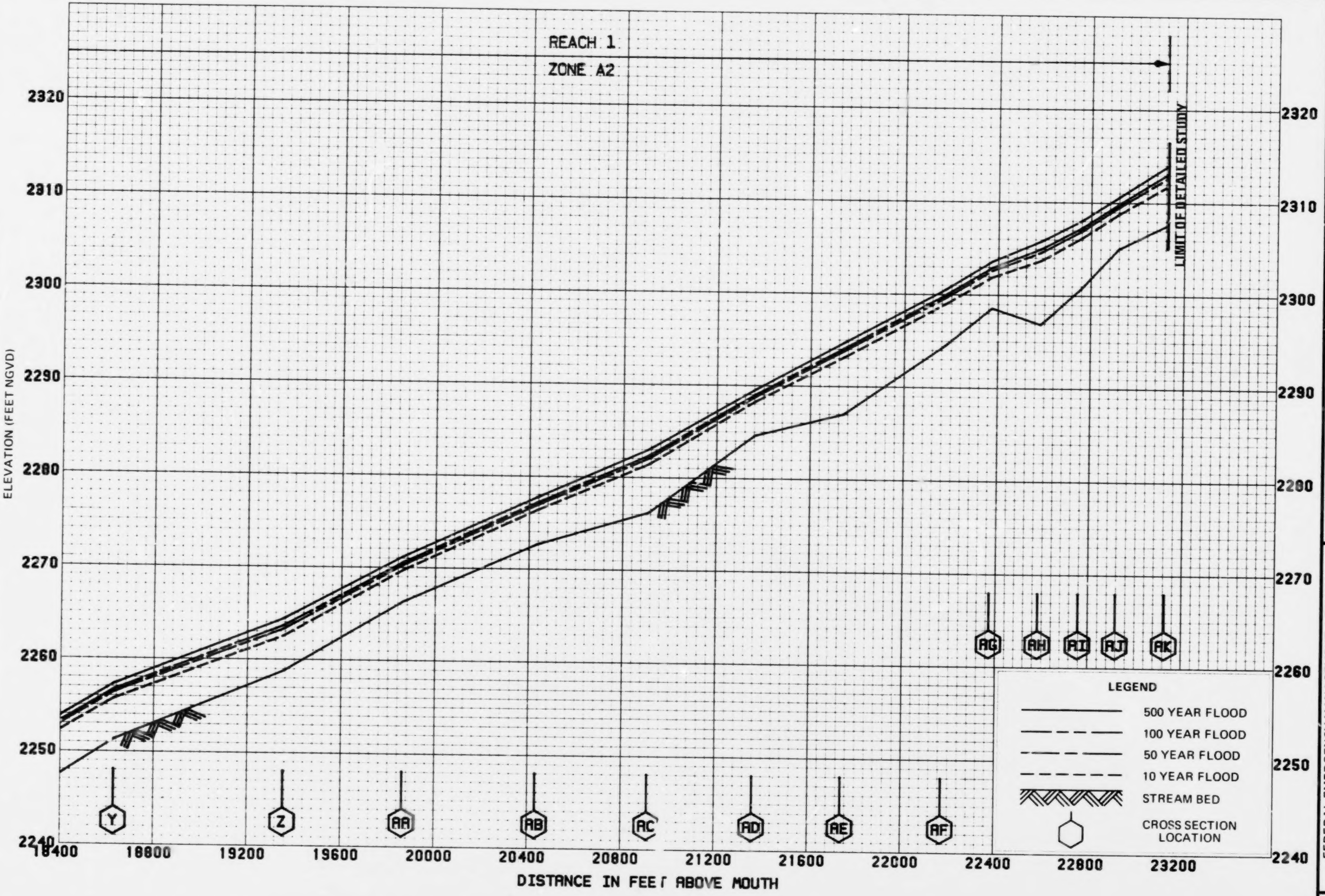

FLOOD PROFILES

LIGHTNING CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

14P

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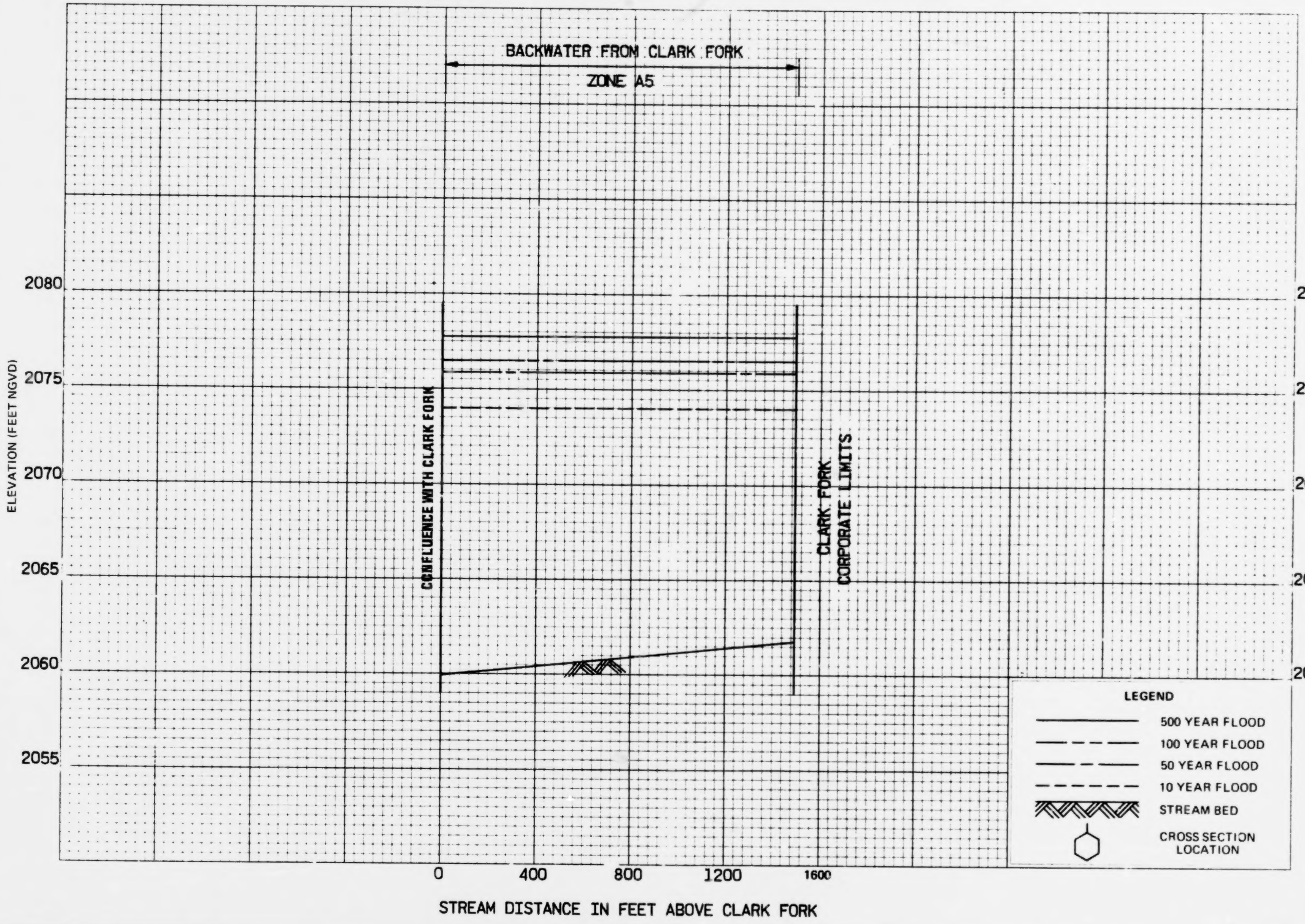


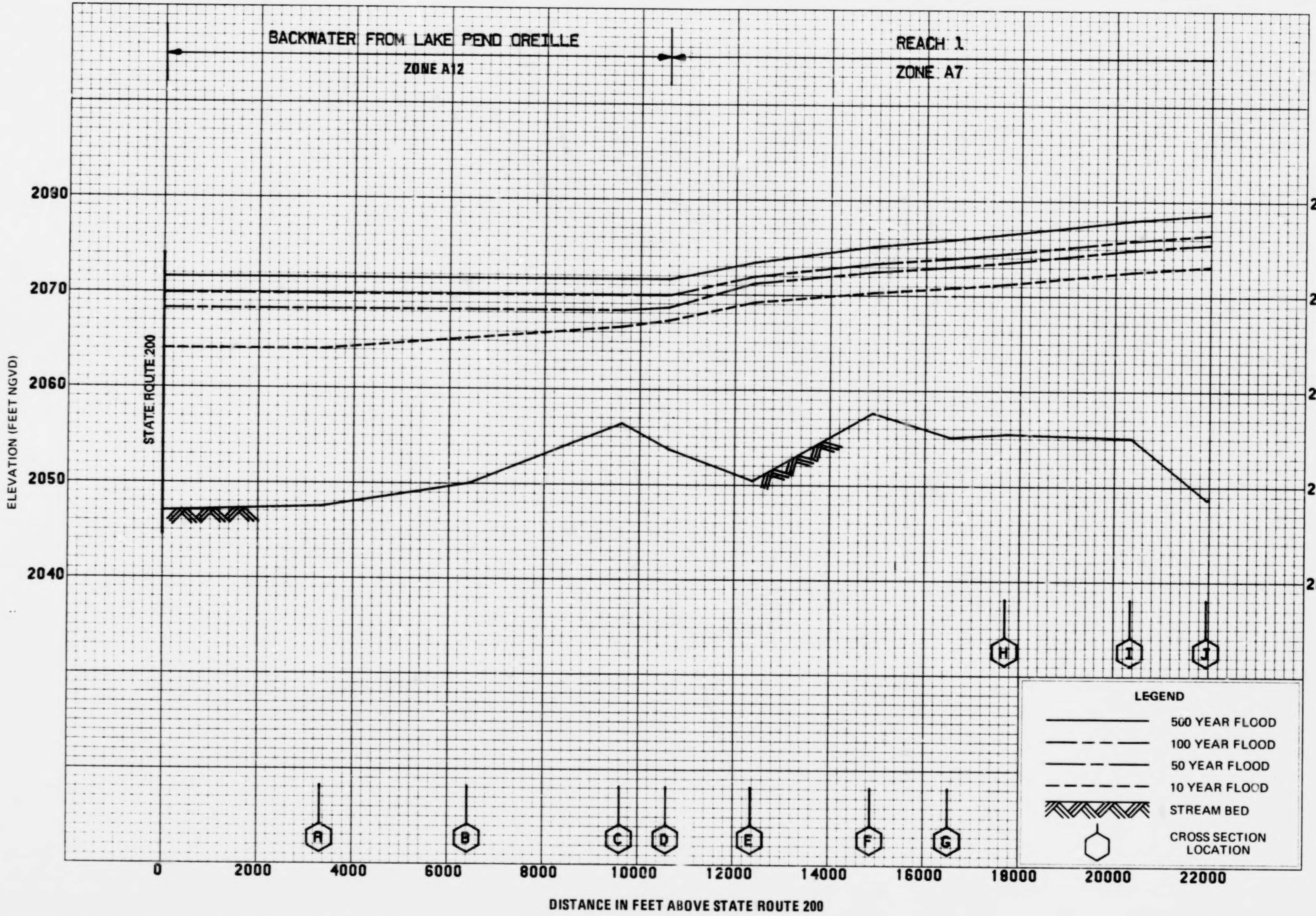
FLOOD PROFILES

MOSQUITO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(BONNER COUNTY)

15P



FLOOD PROFILES

PACK RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

16P

71

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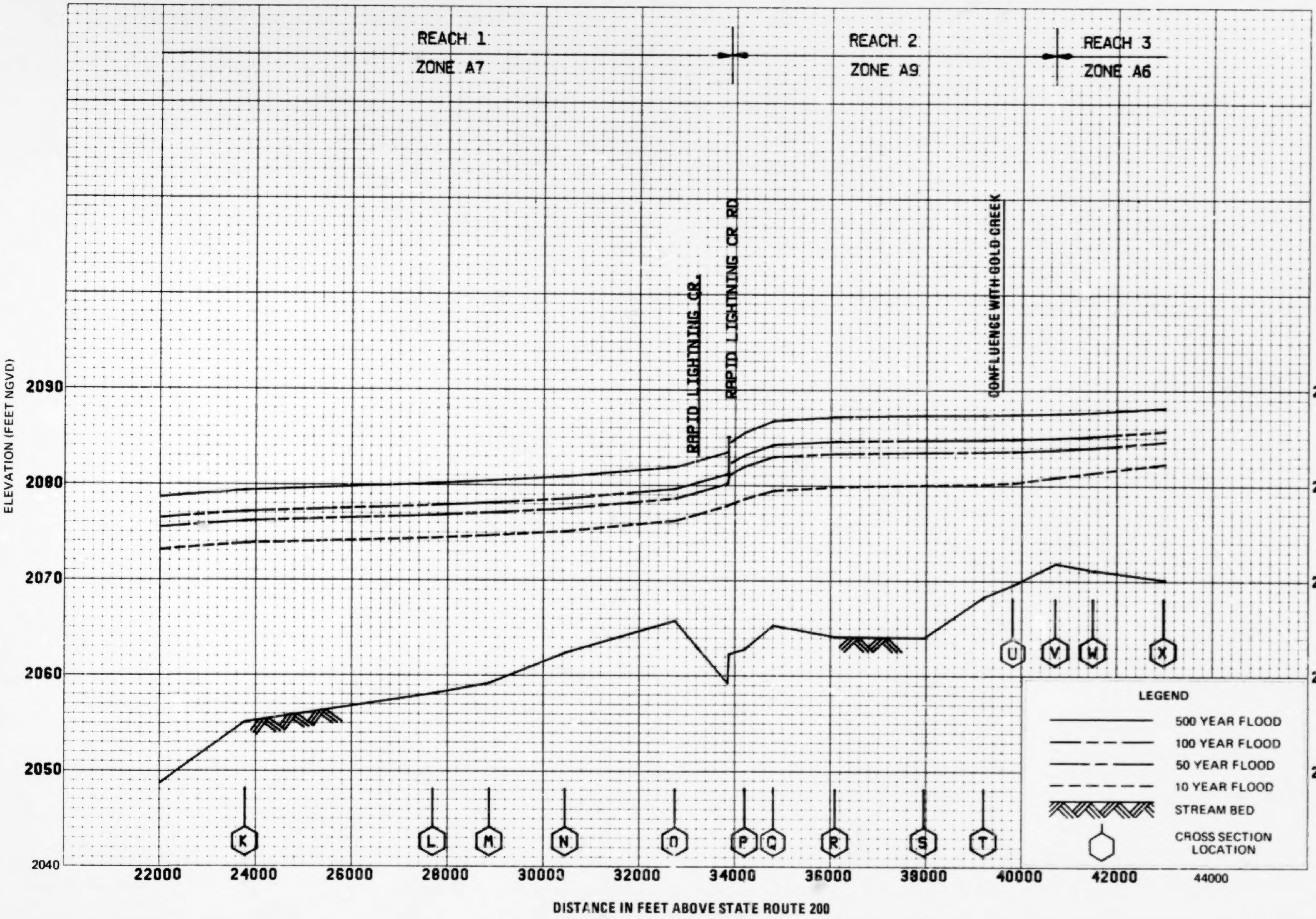

FLOOD PROFILES

PACK RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

17P

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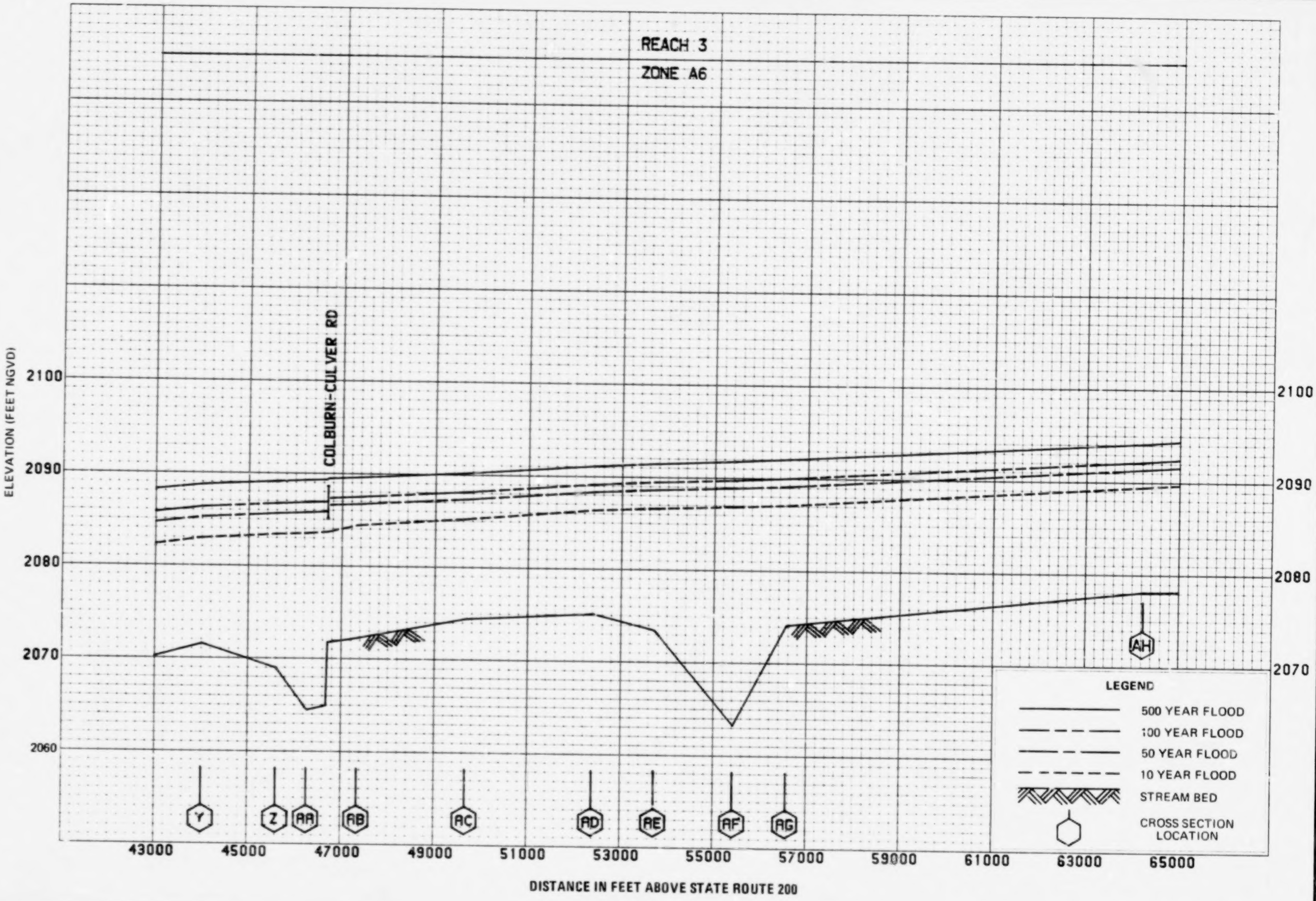

FLOOD PROFILES

PACK RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

18P

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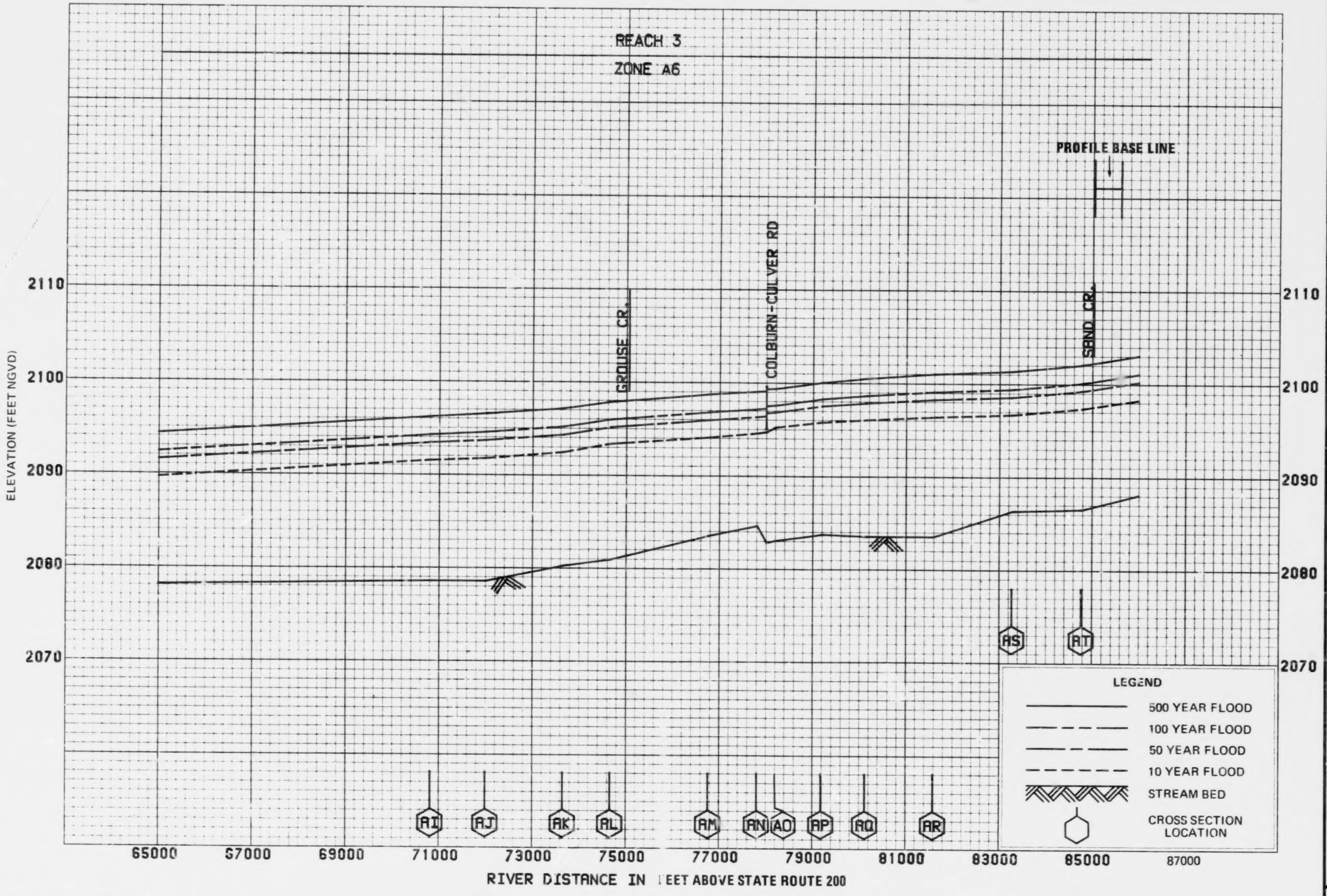

FLOOD PROFILES

PACK RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

19P

74

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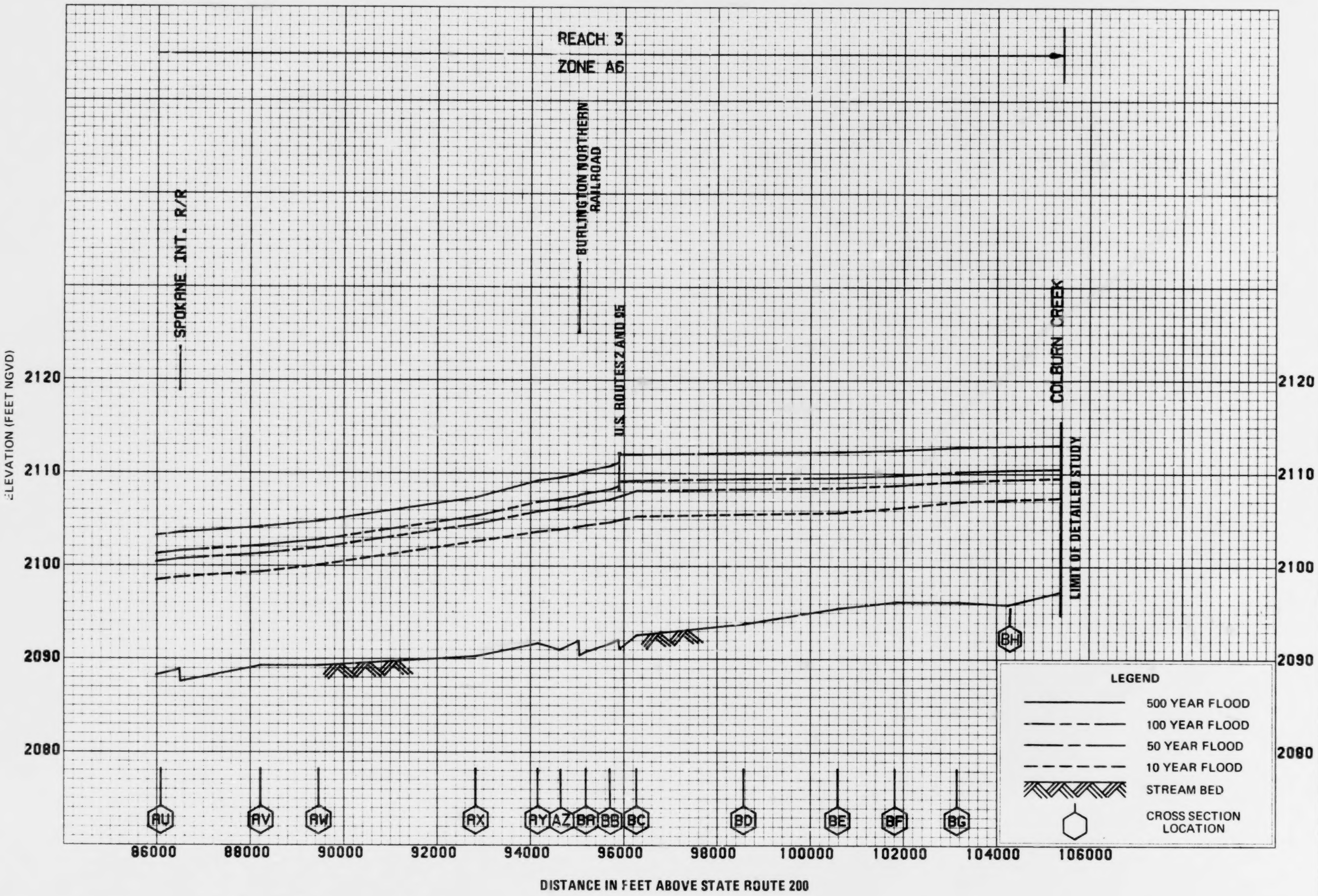

FLOOD PROFILES

PACK RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

20P

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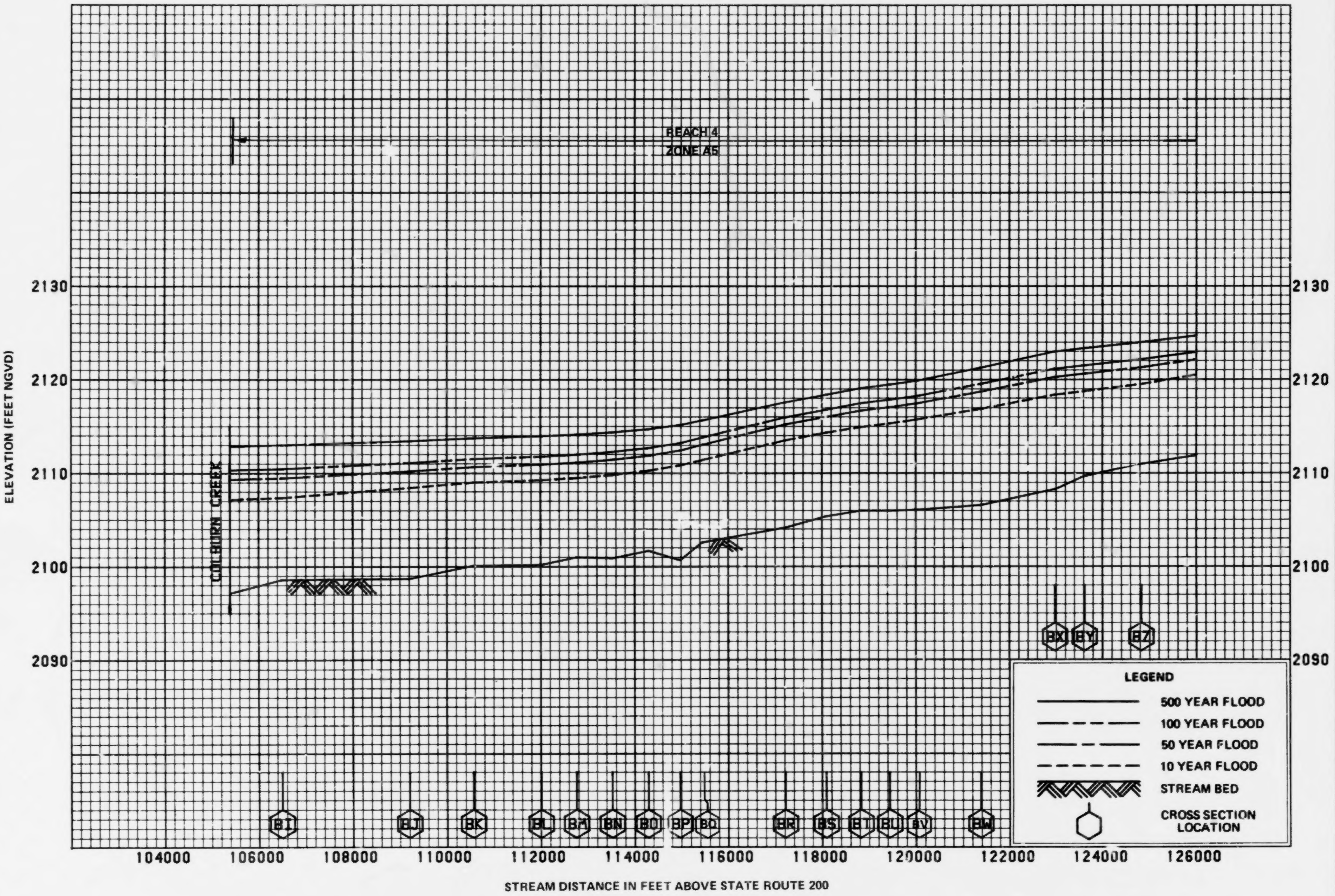

FLOOD PROFILES

PACK RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

21P

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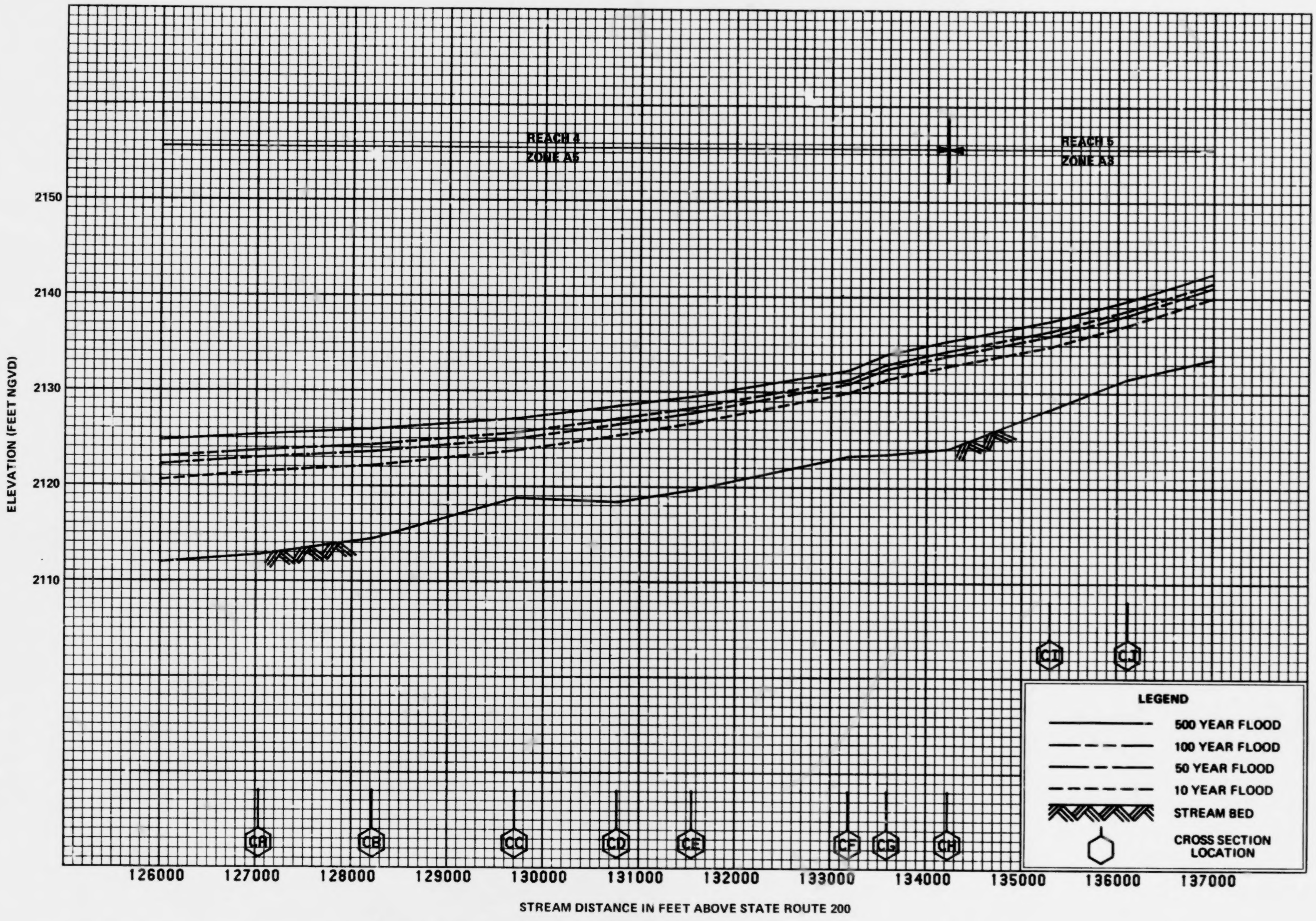


FLOOD PROFILES

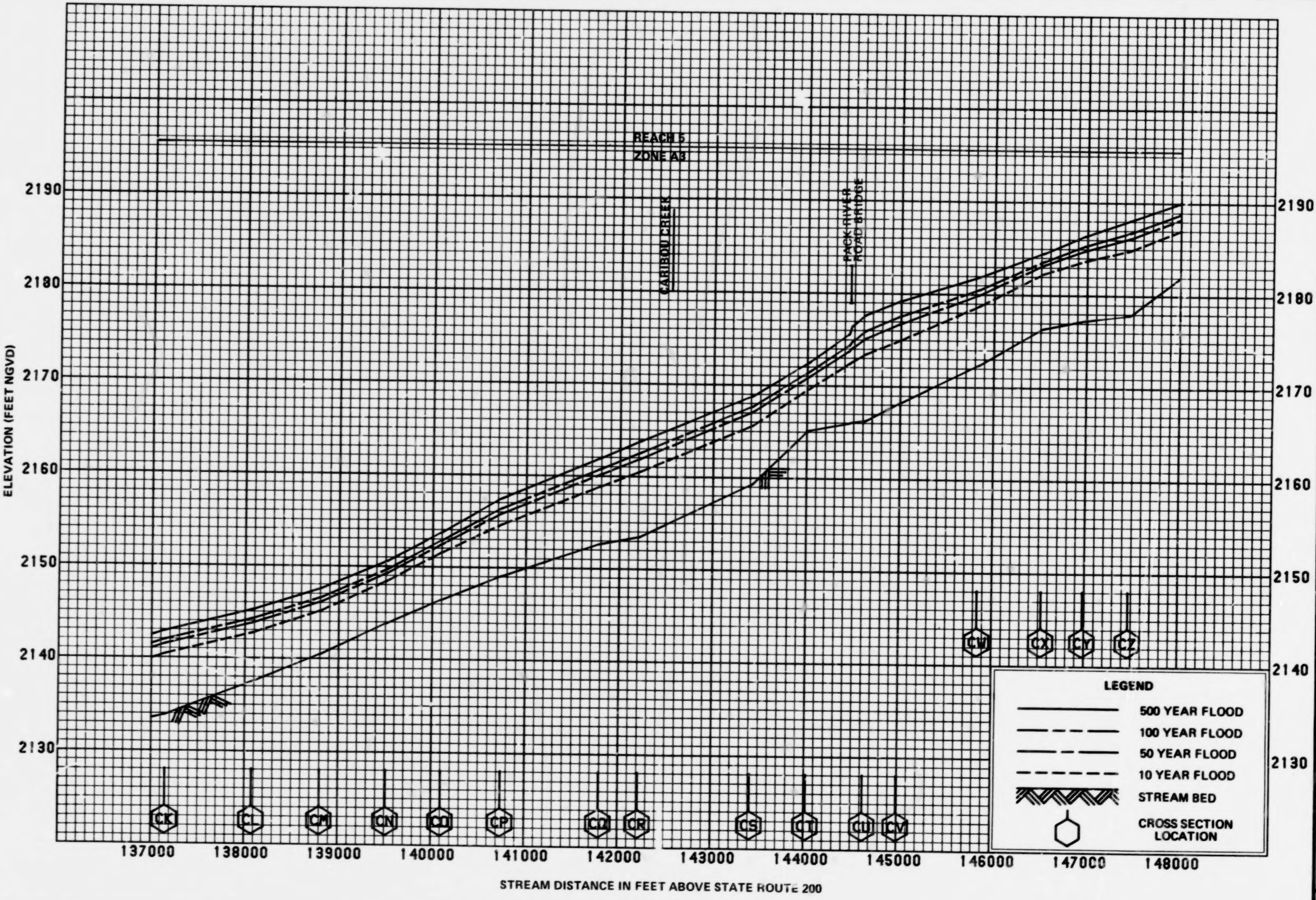
PACK RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

22P

77



FLOOD PROFILES

PACK RIVER

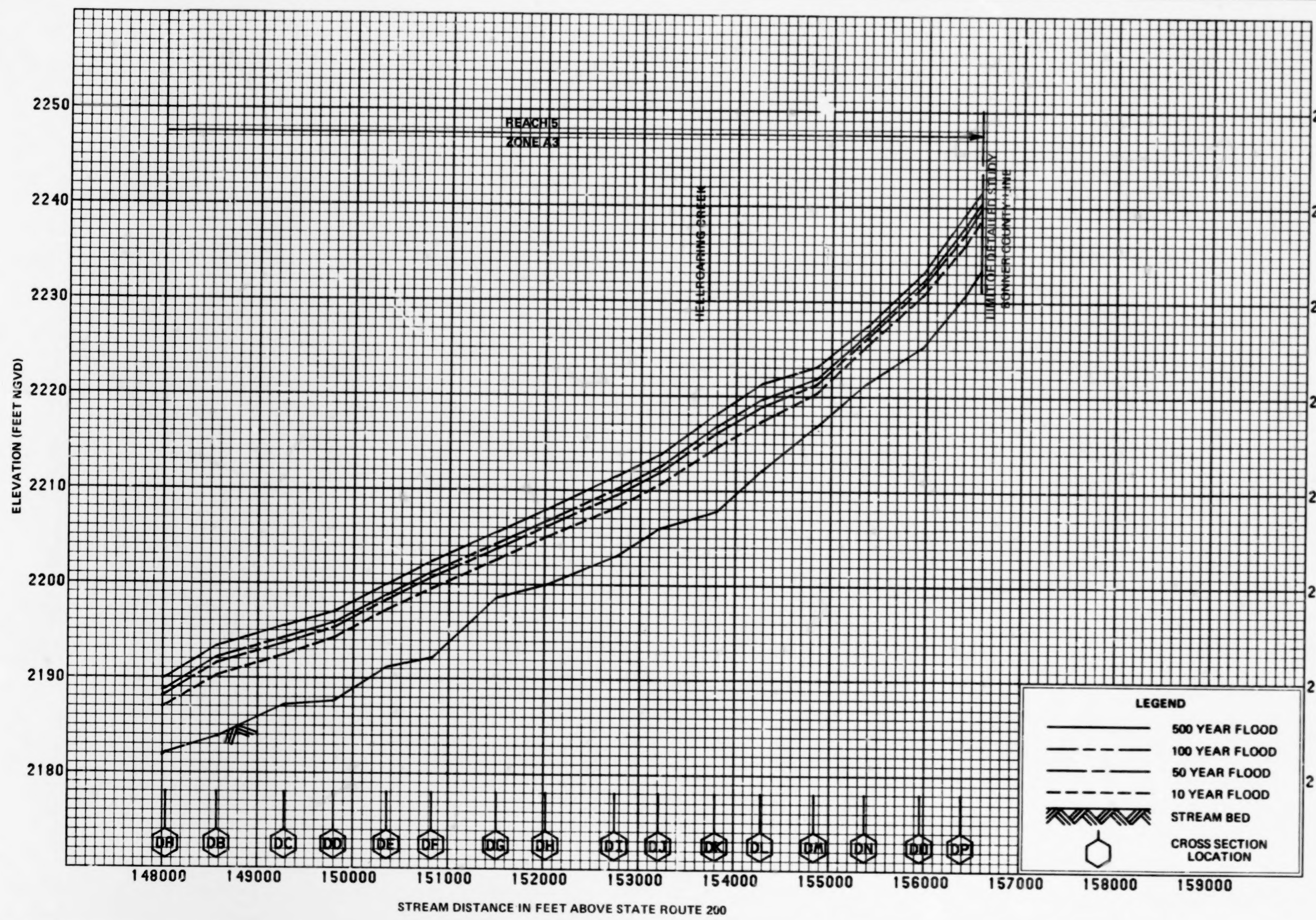
FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

23P

BEST COPY AVAILABLE

78



FLOOD PROFILES

PACK RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

24P

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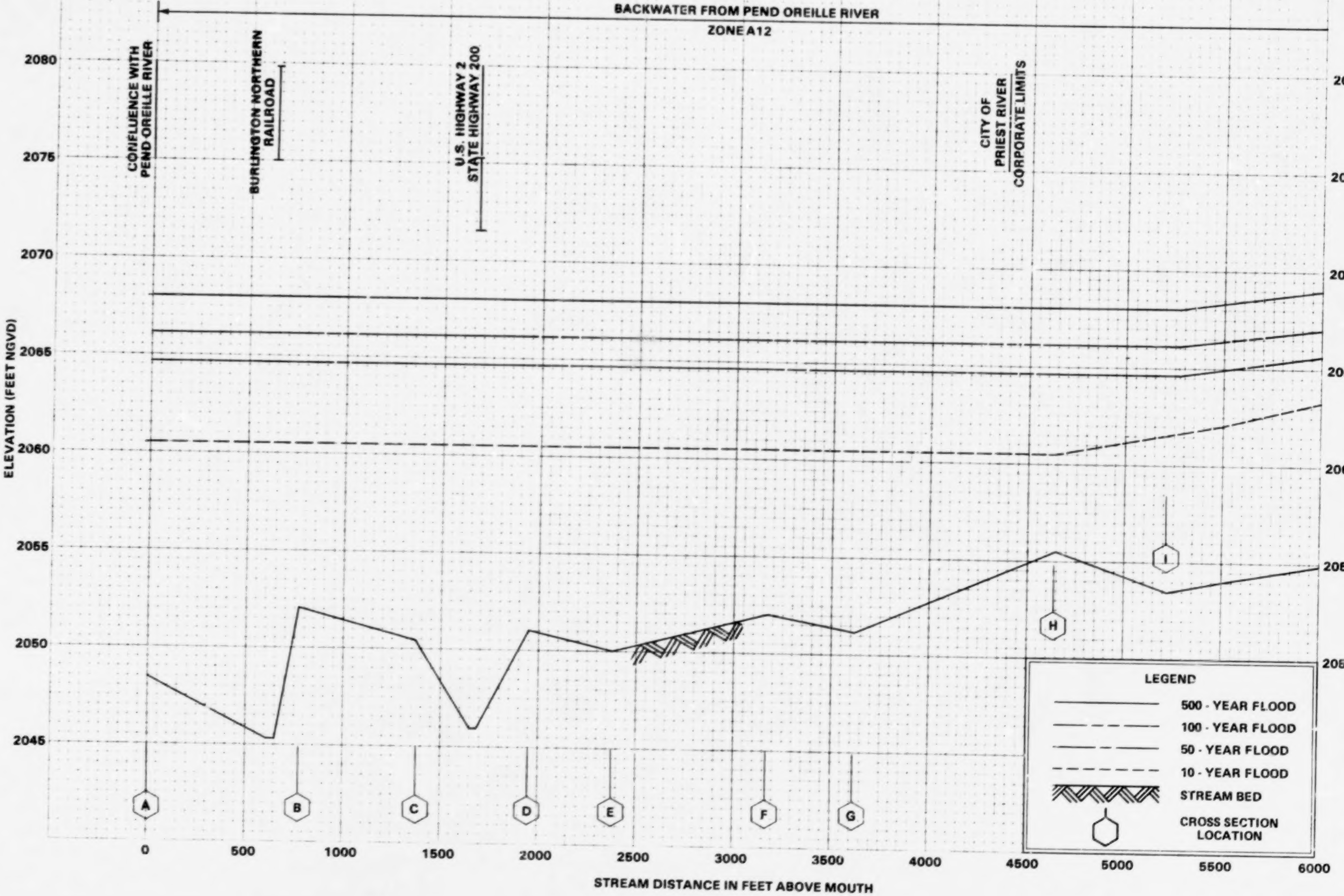
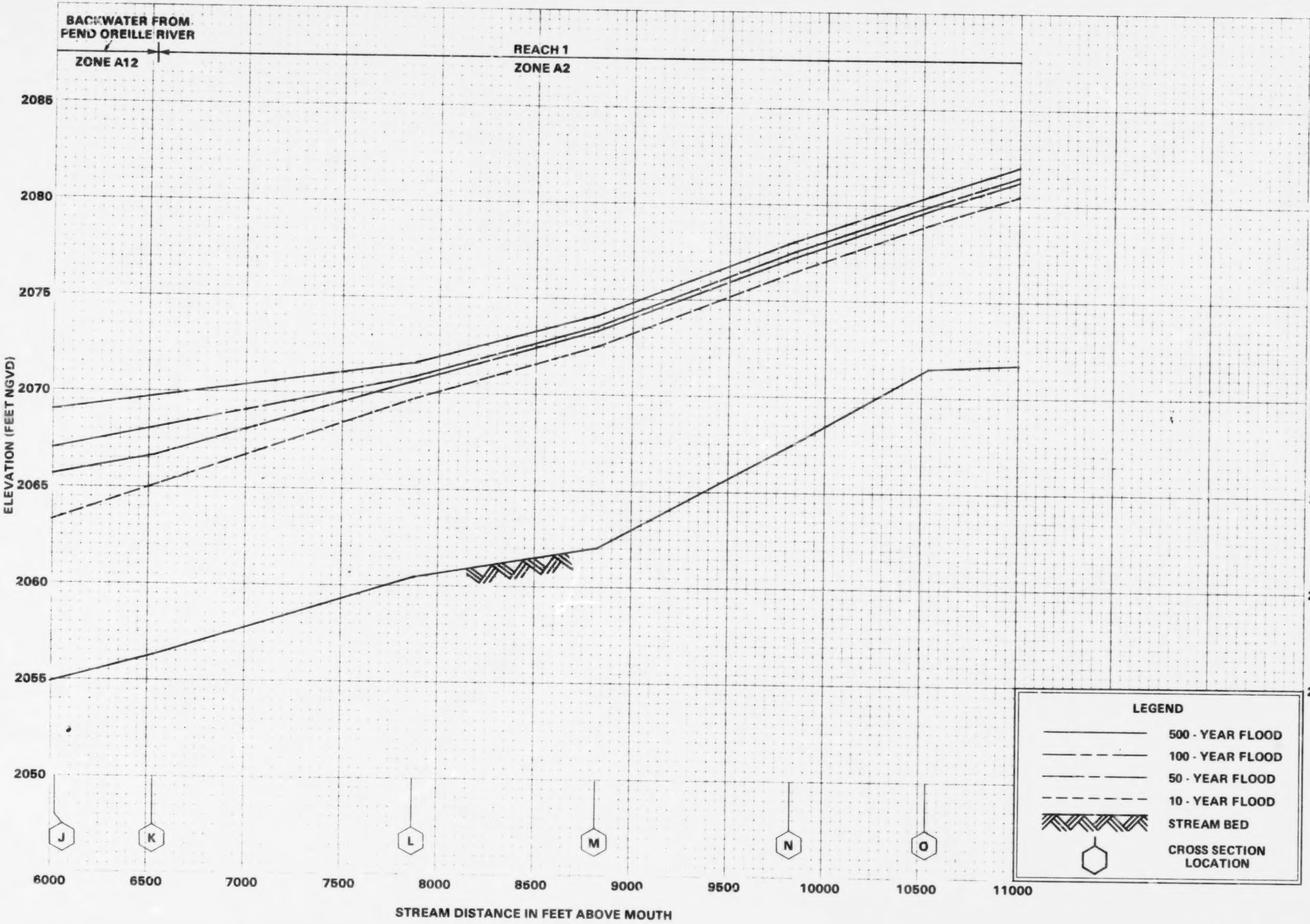


FLOOD PROFILES

PRIEST RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)



FLOOD PROFILES

PRIEST RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

26P

81

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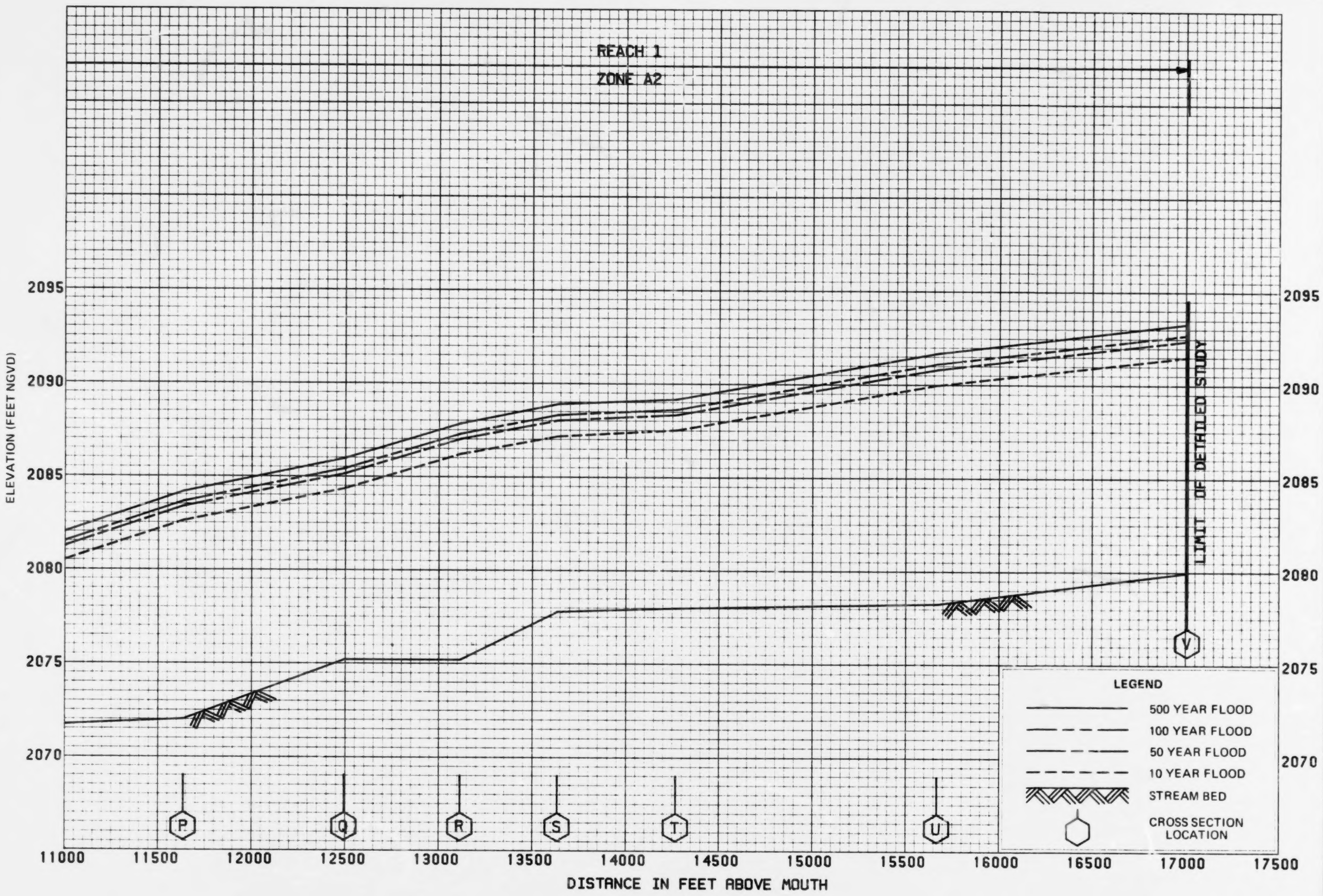

FLOOD PROFILES

PRIEST RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

27P

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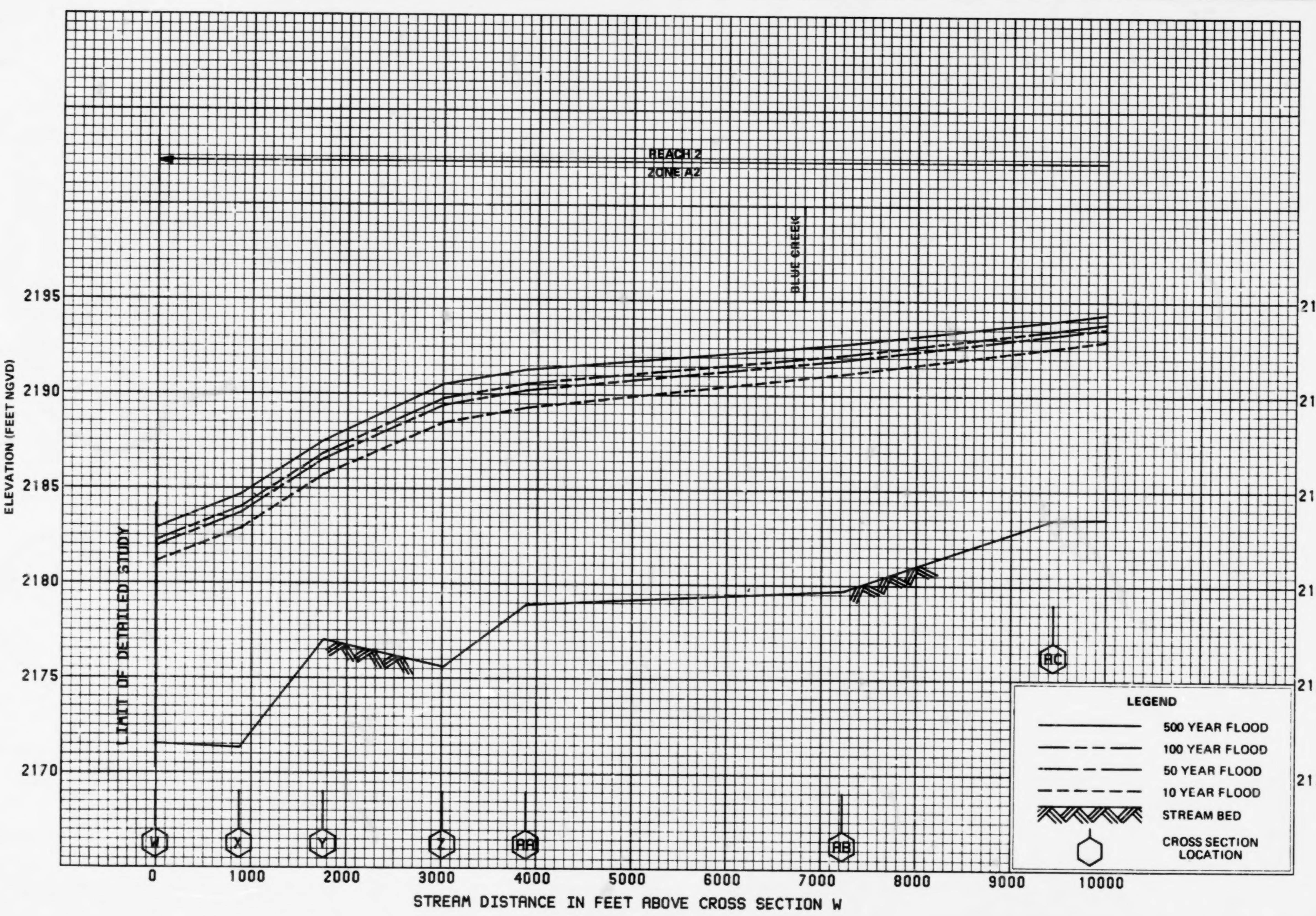


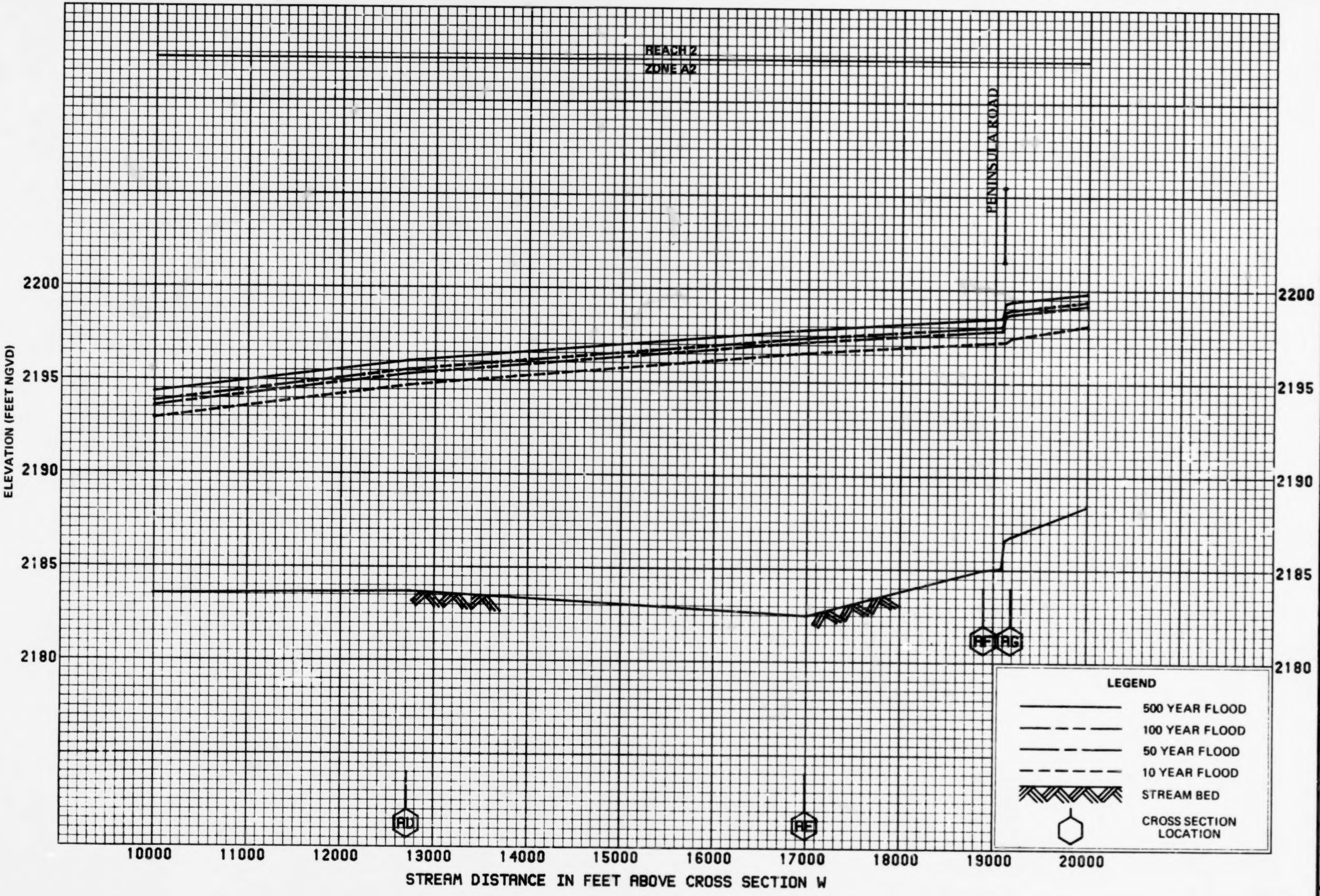
FLOOD PROFILES

PRIEST RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

28P



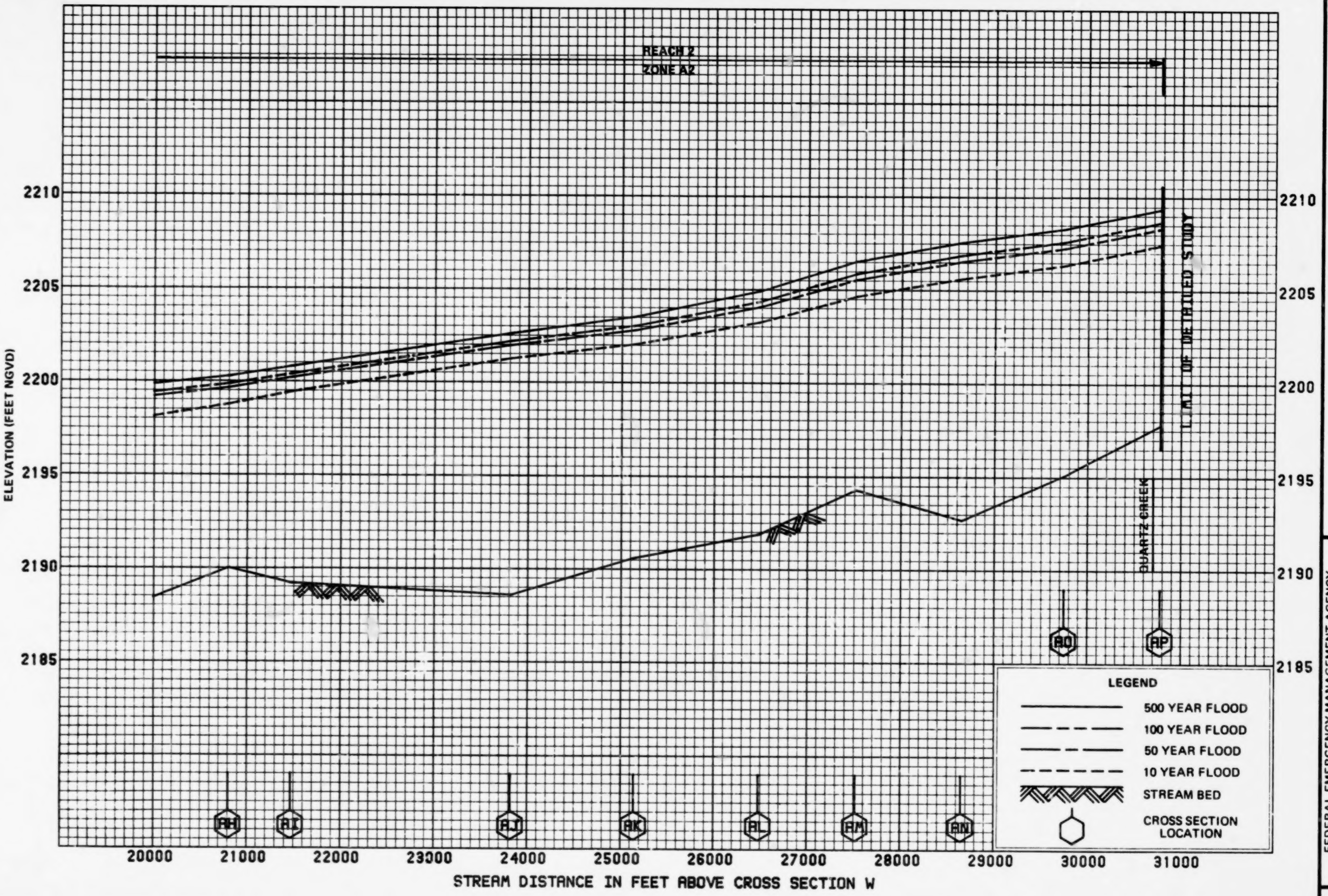
FLOOD PROFILES

PRIEST RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

29P



FLOOD PROFILES

PRIEST RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

30P

85

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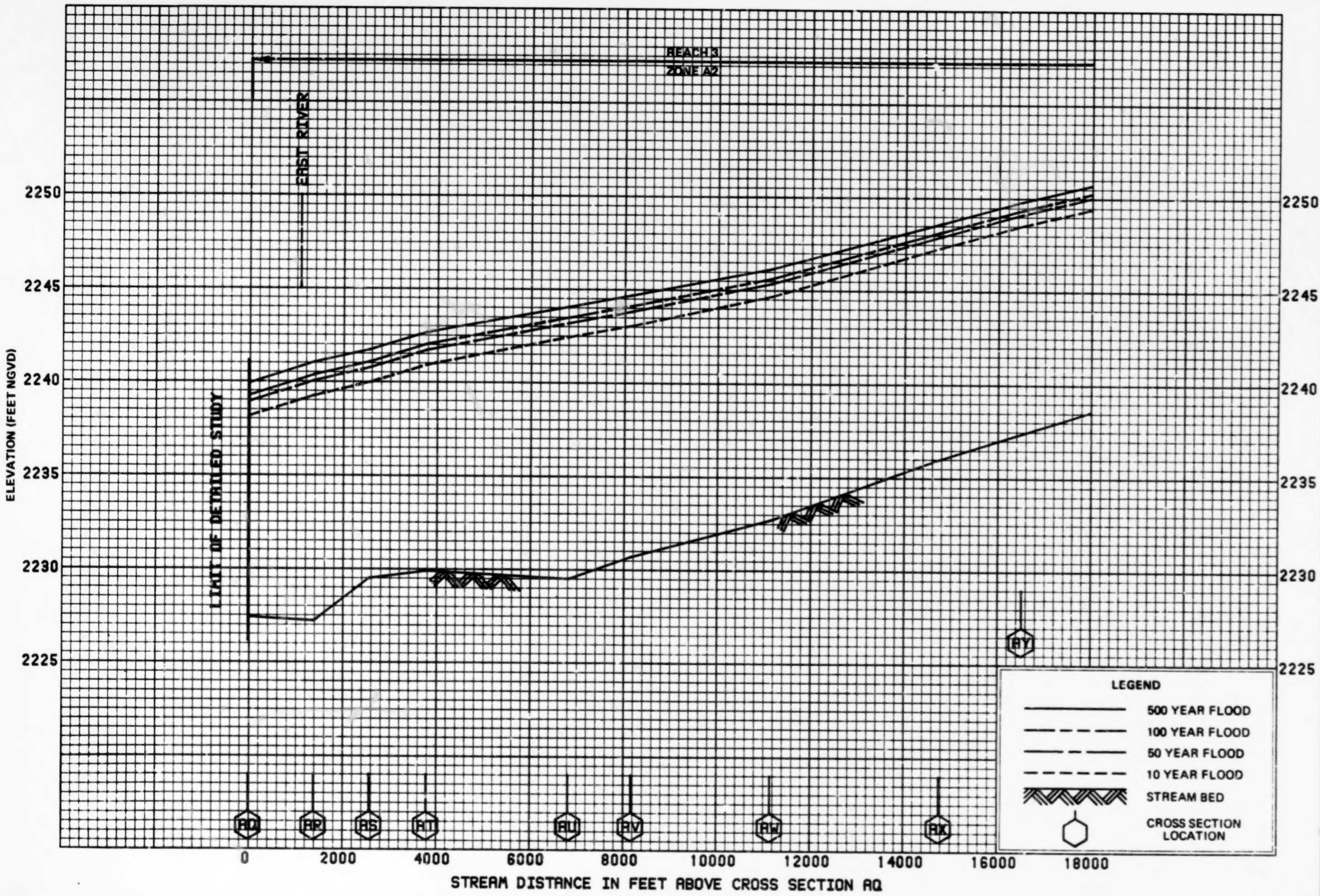


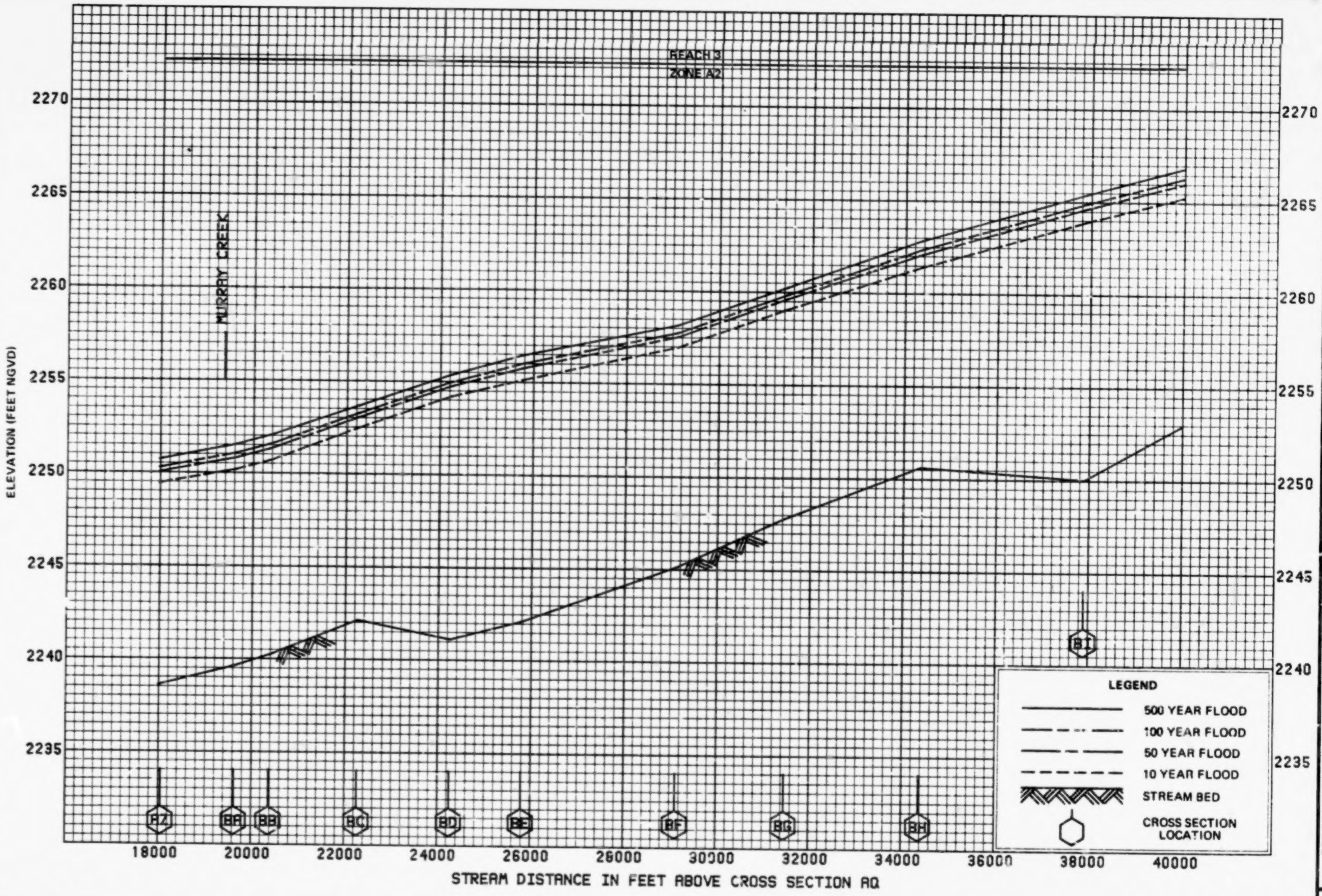
FLOOD PROFILES

PRIEST RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

31P



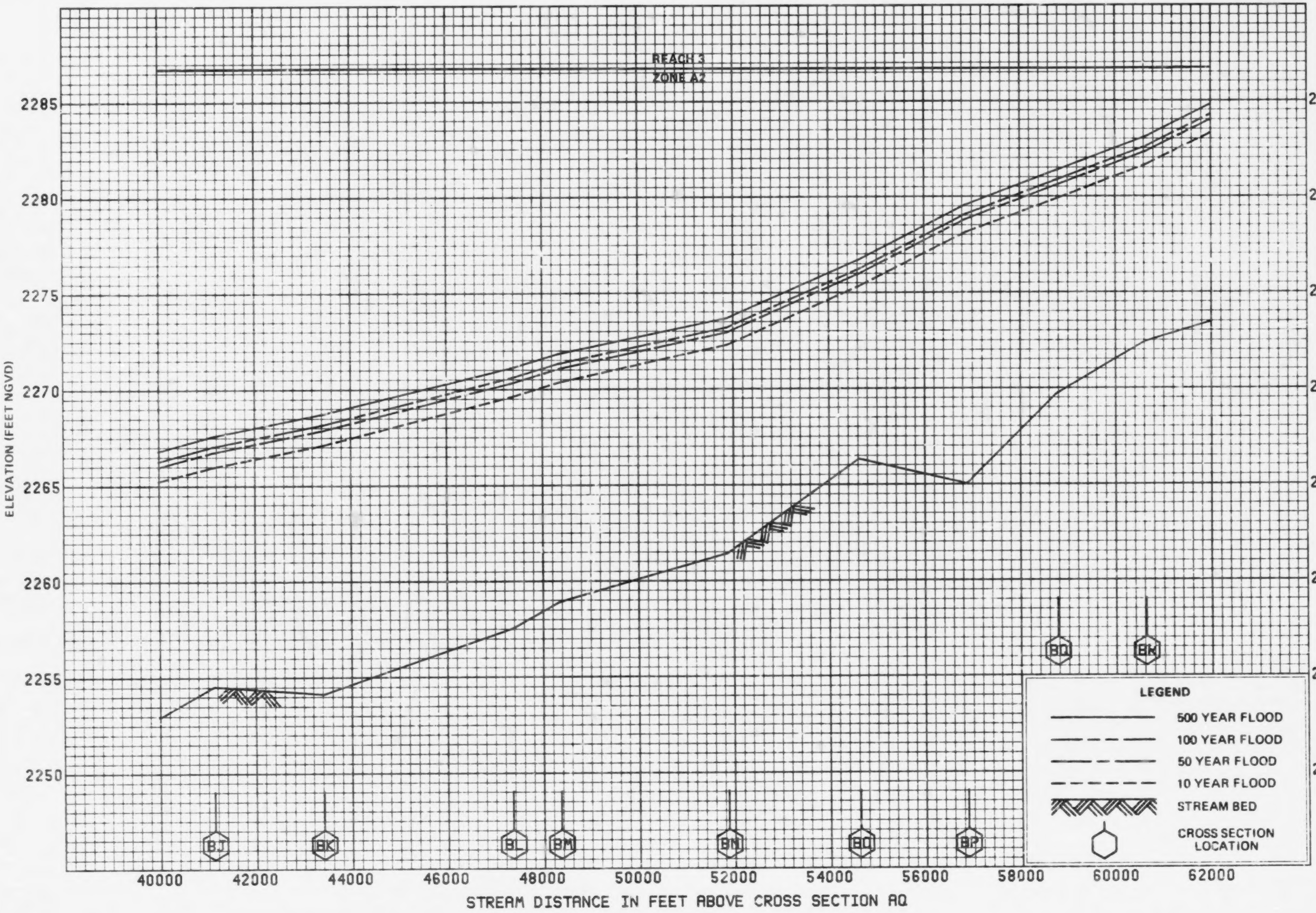
FLOOD PROFILES

PRIEST RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

32P



FEDERAL EMERGENCY MANAGEMENT AGENCY

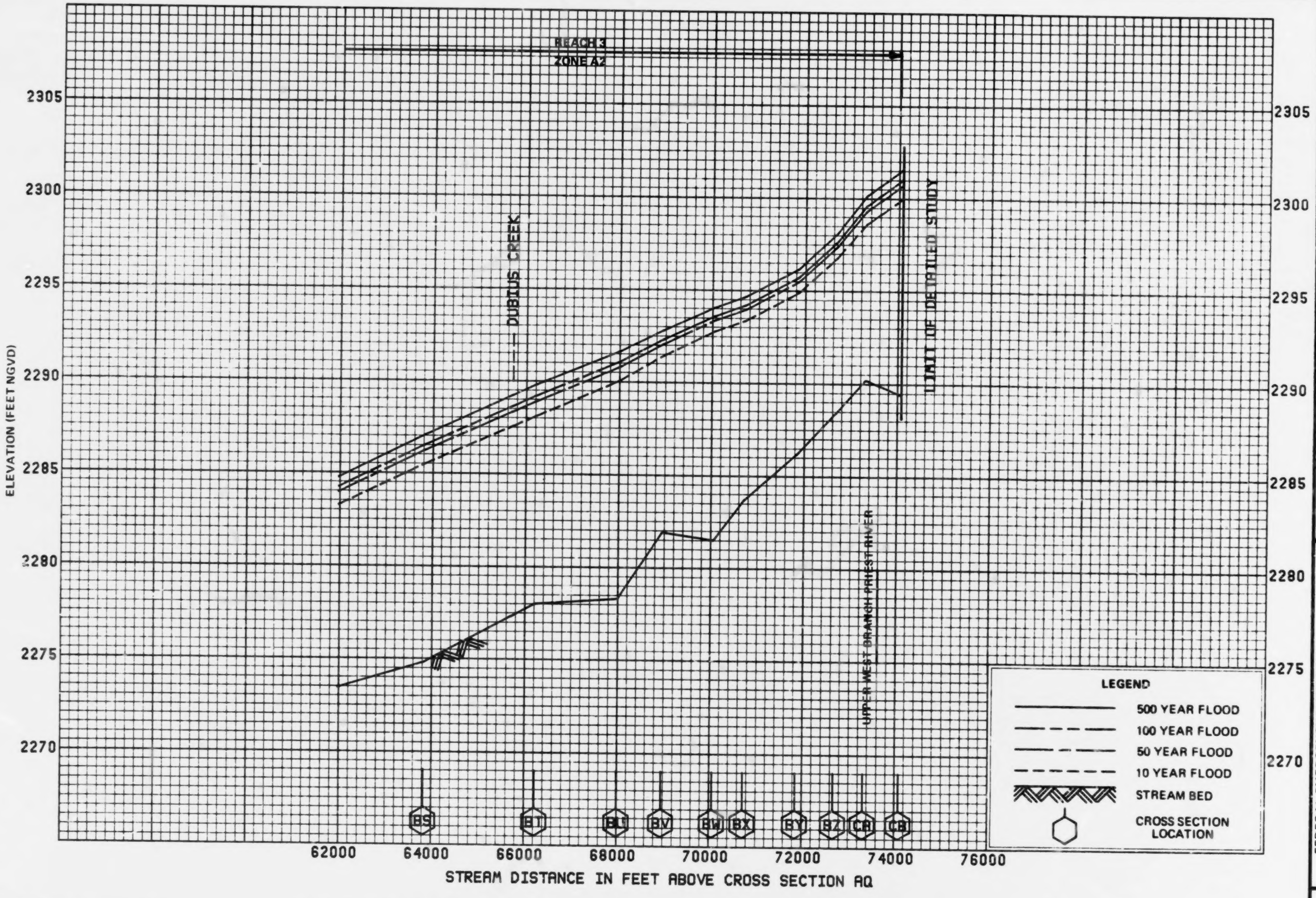
BONNER COUNTY, ID
(UNINCORPORATED AREAS)

FLOOD PROFILES

PRIEST RIVER

33P

88



FLOOD PROFILES

PRIEST RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

34P

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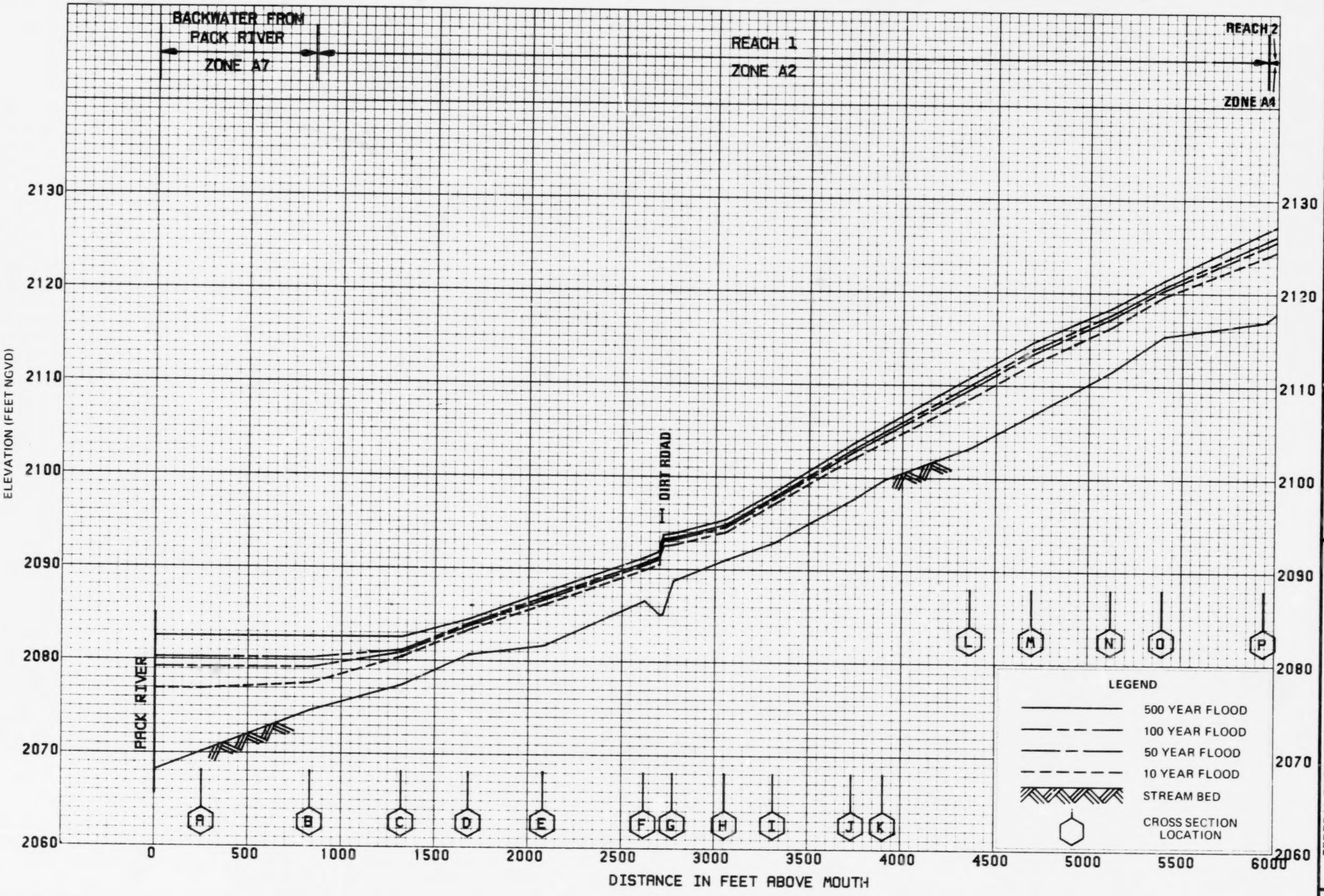


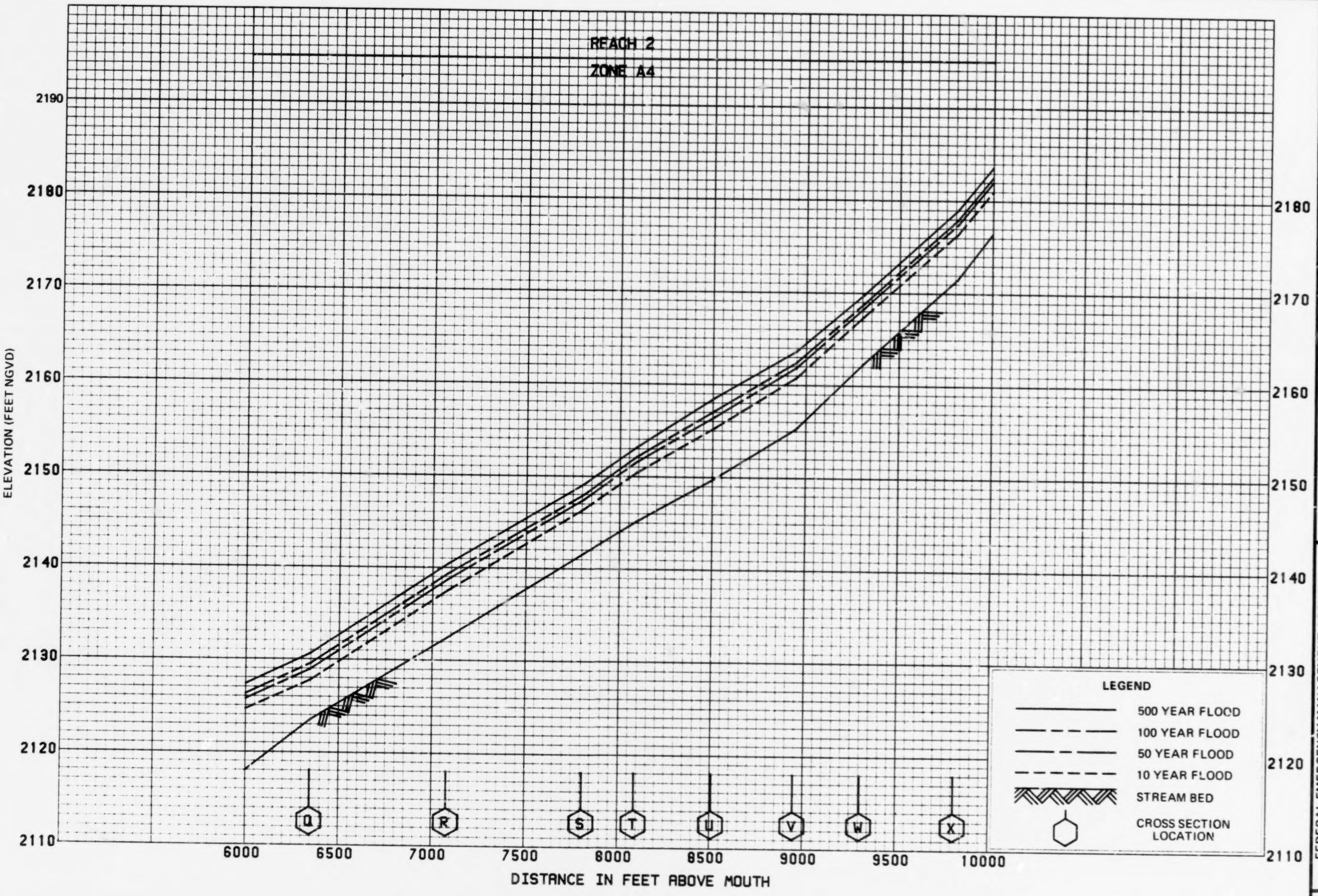
FLOOD PROFILES

RAPID LIGHTNING CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

35P



FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

FLOOD PROFILES

RAPID LIGHTNING CREEK

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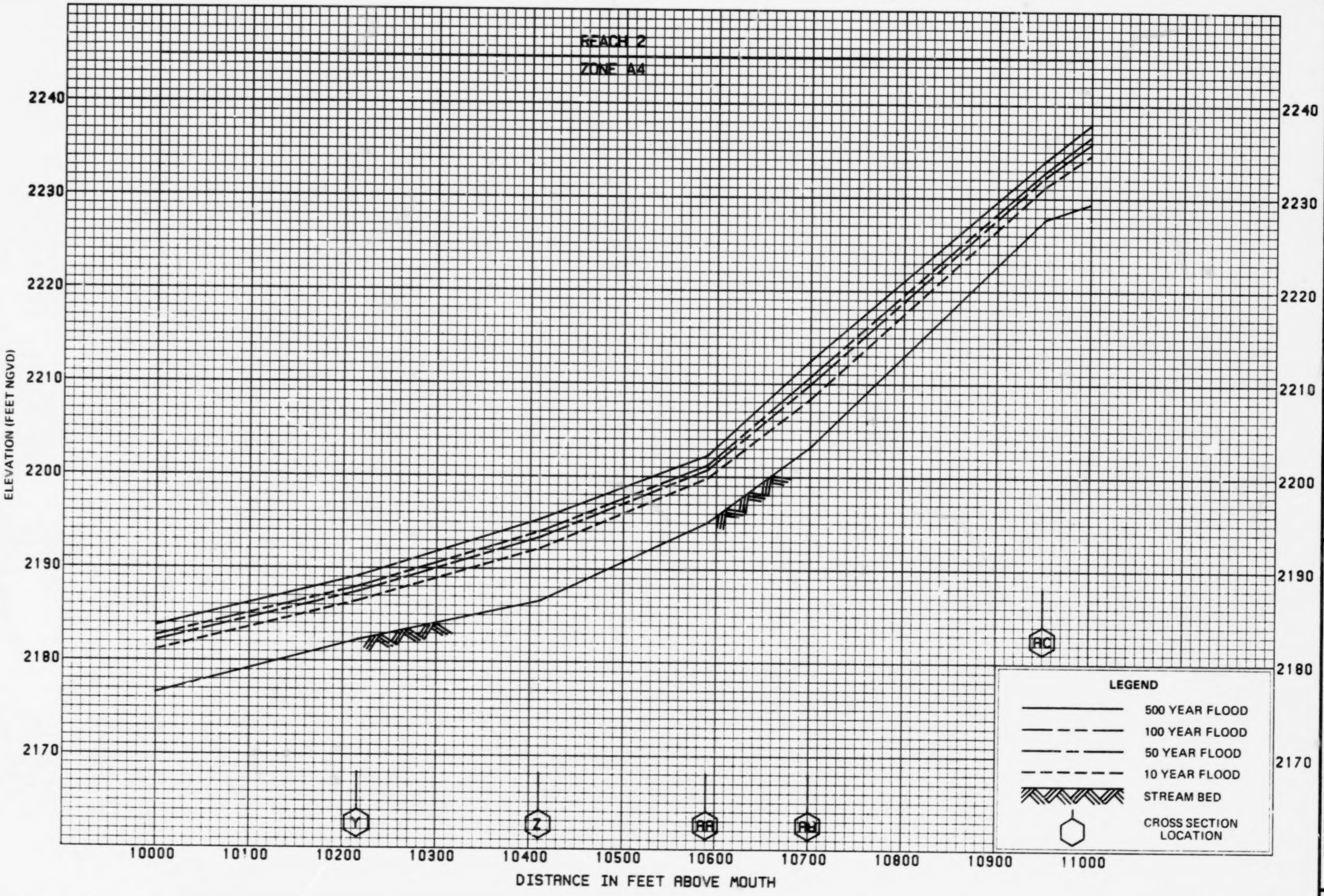


FLOOD PROFILES

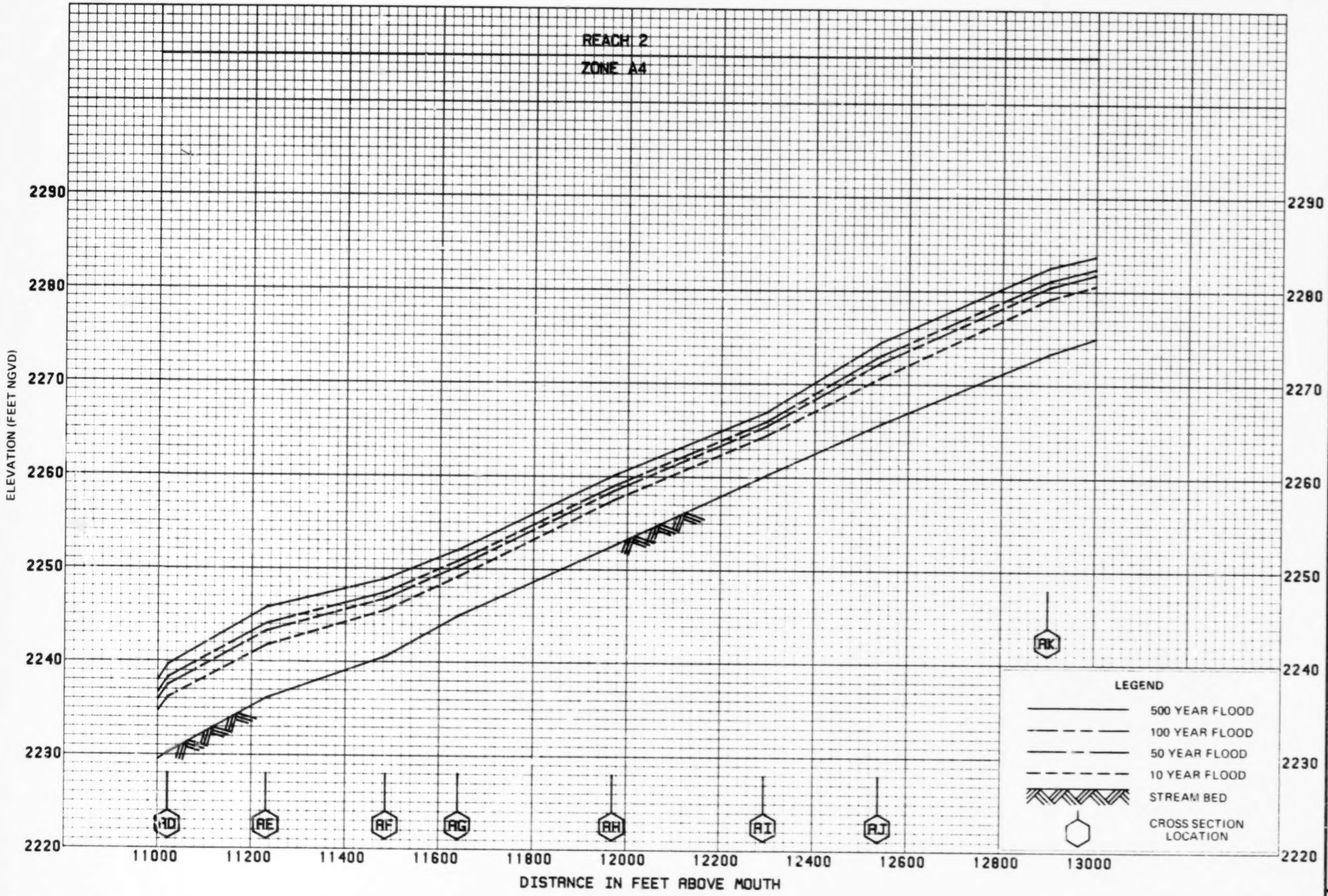
RAPID LIGHTNING CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

37P

92



FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

FLOOD PROFILES

RAPID LIGHTNING CREEK

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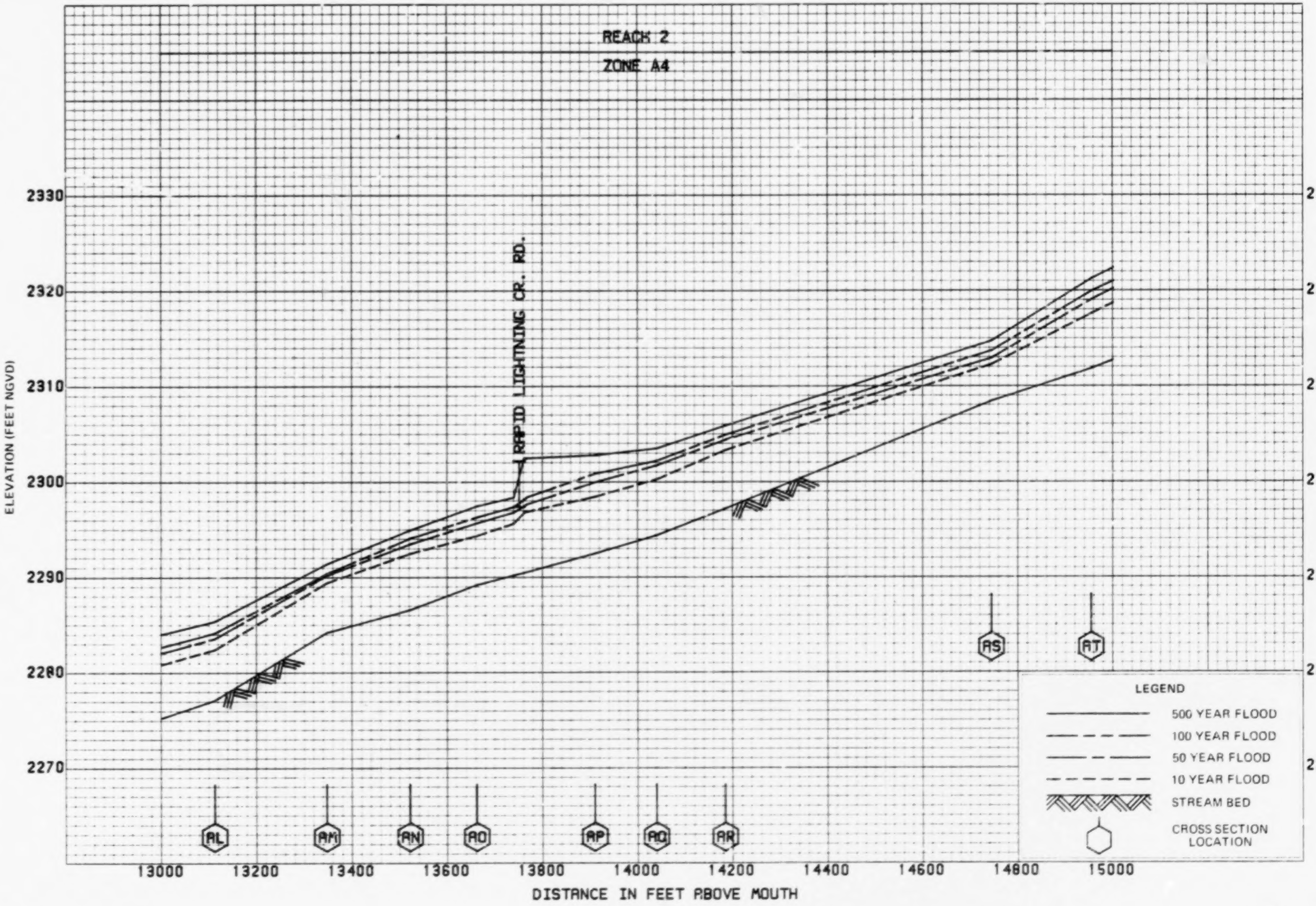


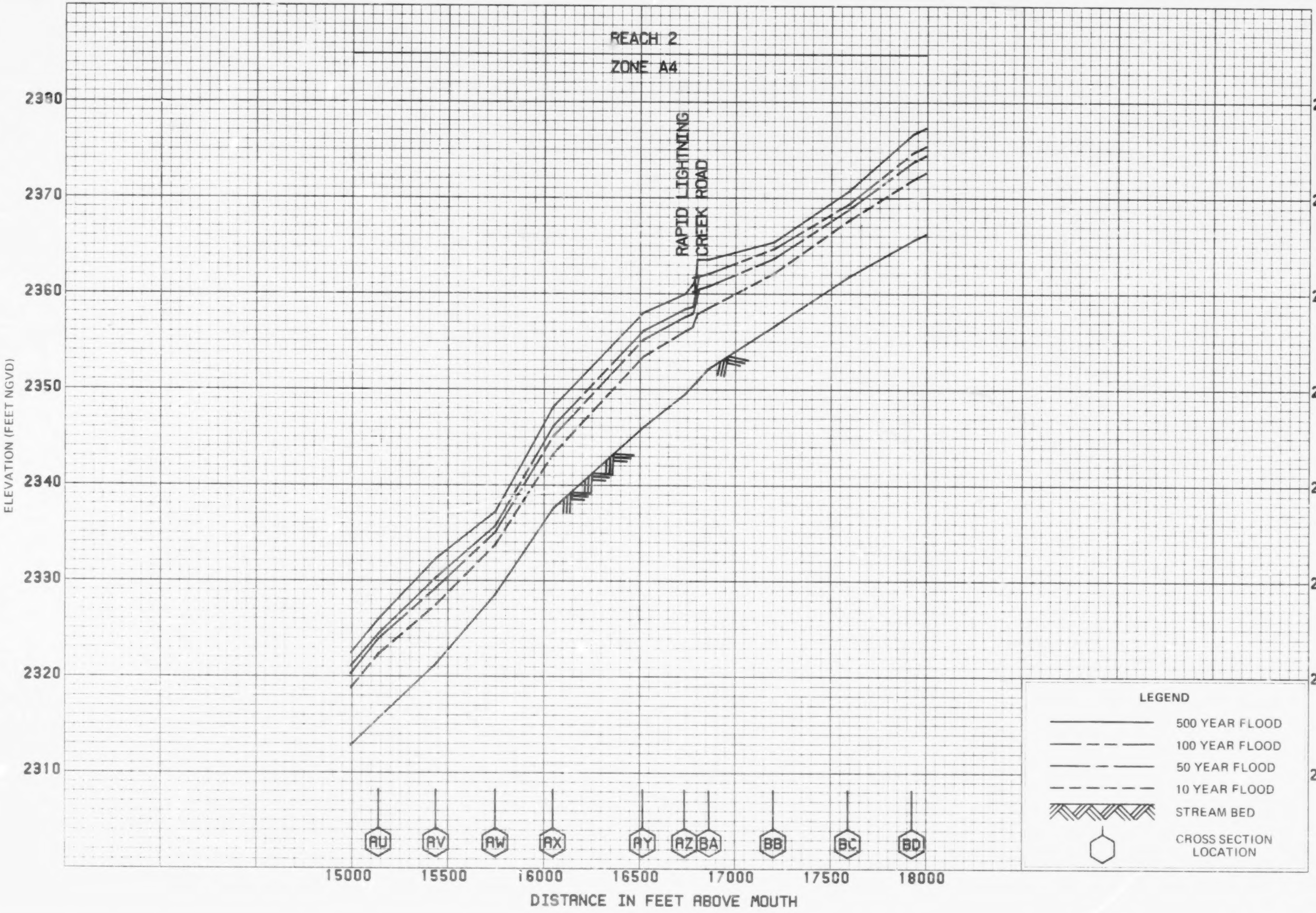
FLOOD PROFILES

RAPID LIGHTNING CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

39P



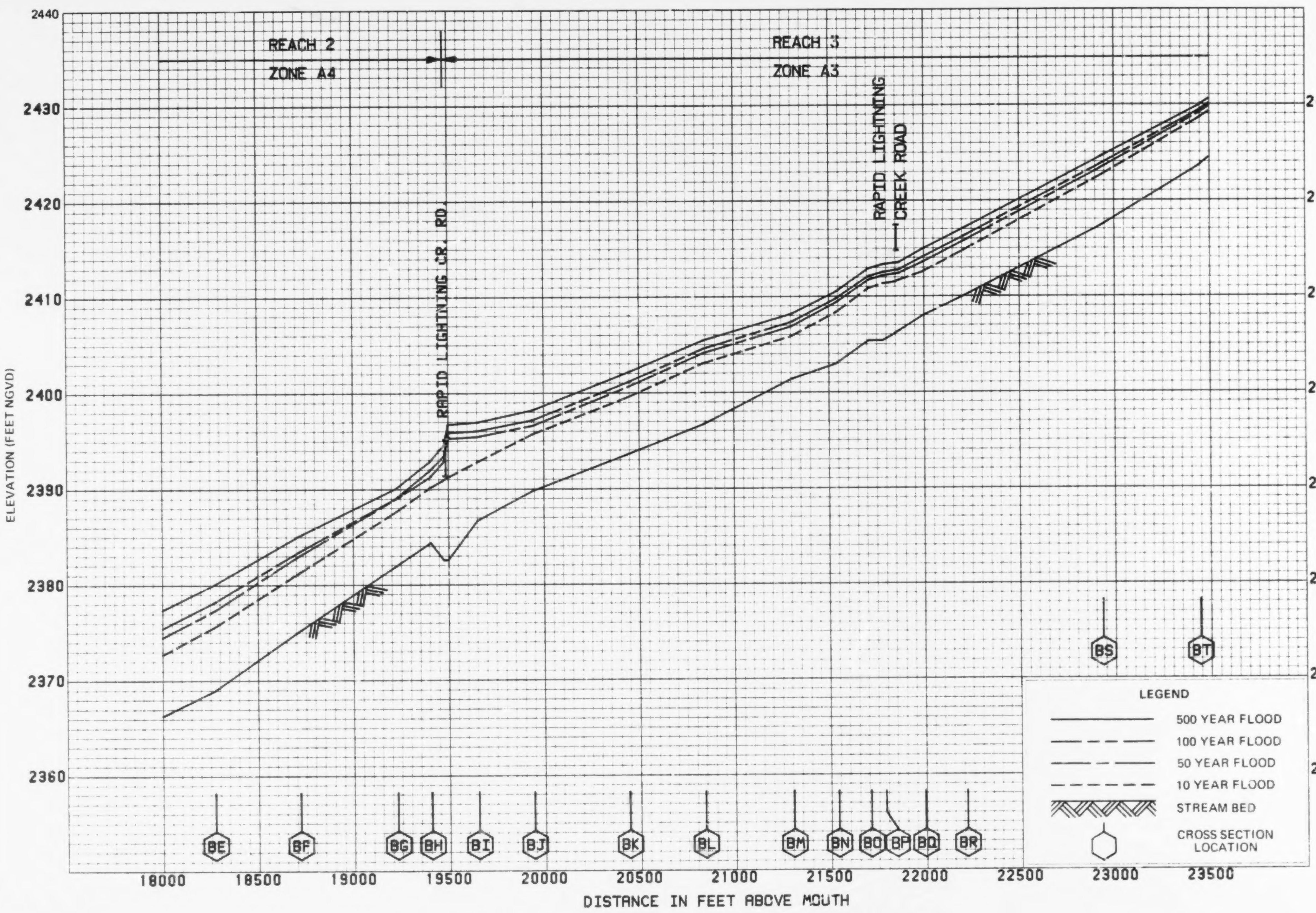
FLOOD PROFILES

RAPID LIGHTNING CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

40P



FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

FLOOD PROFILES

RAPID LIGHTNING CREEK

41P

96

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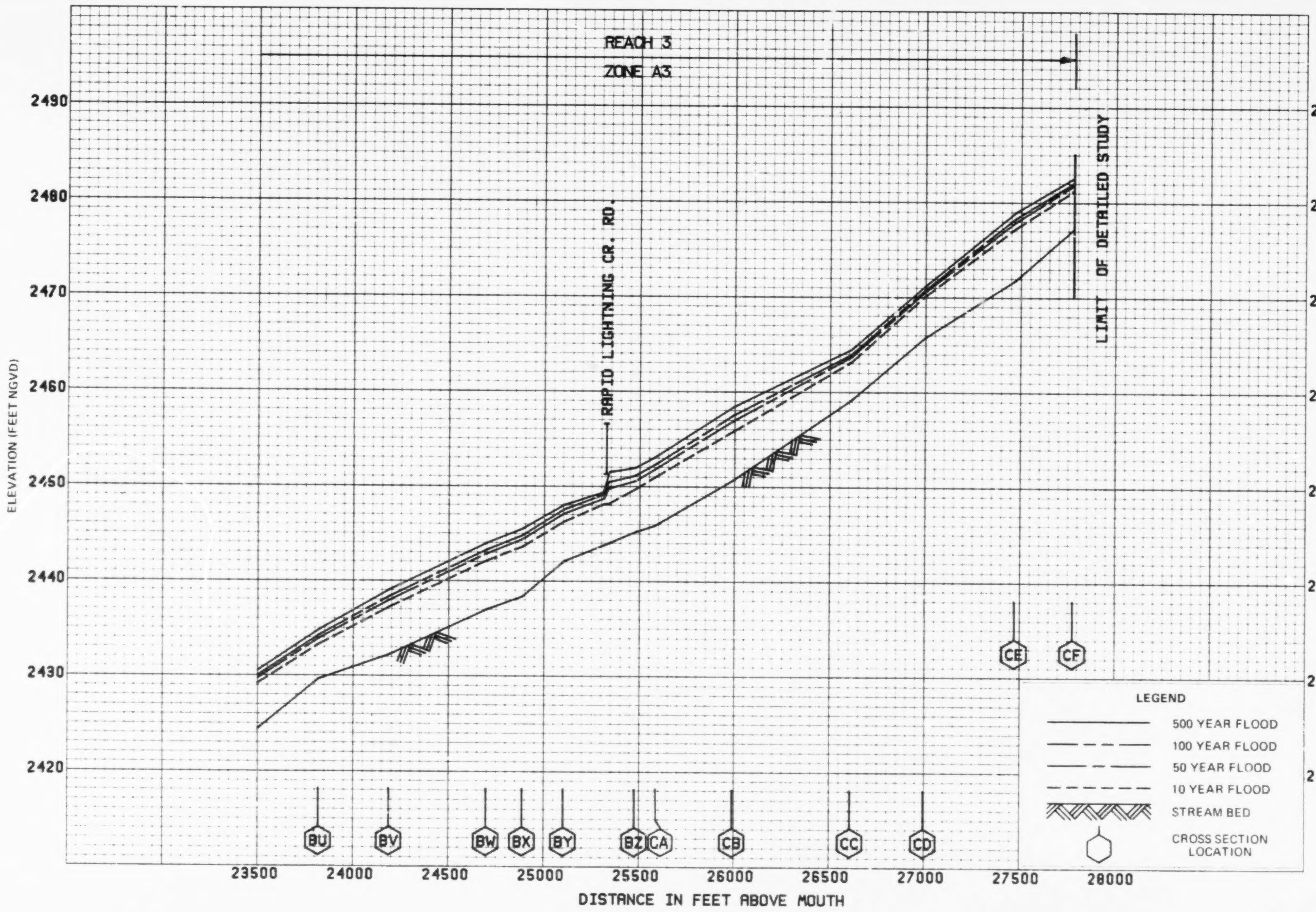
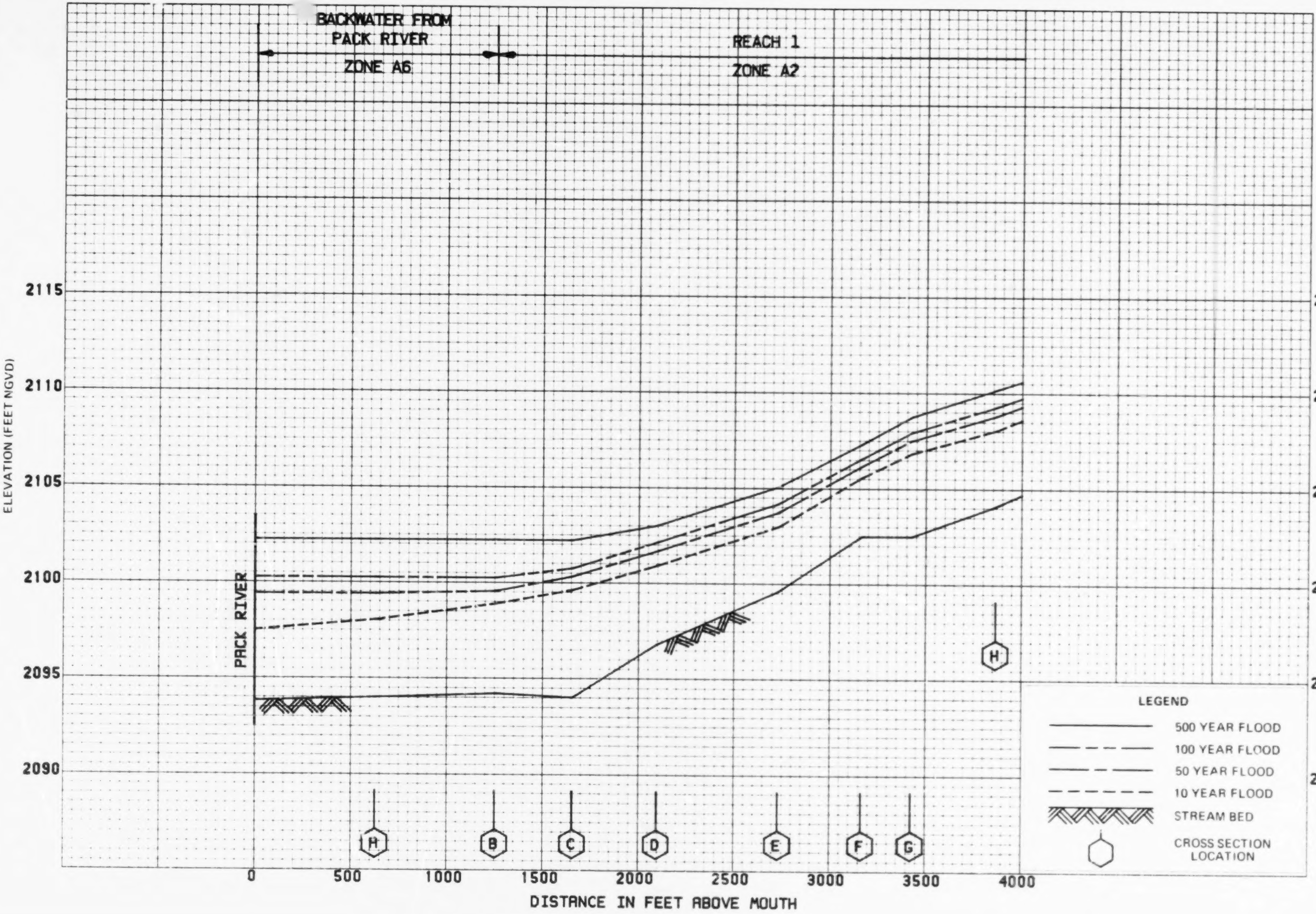


FLOOD PROFILES

RAPID LIGHTNING CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)



FLOOD PROFILES

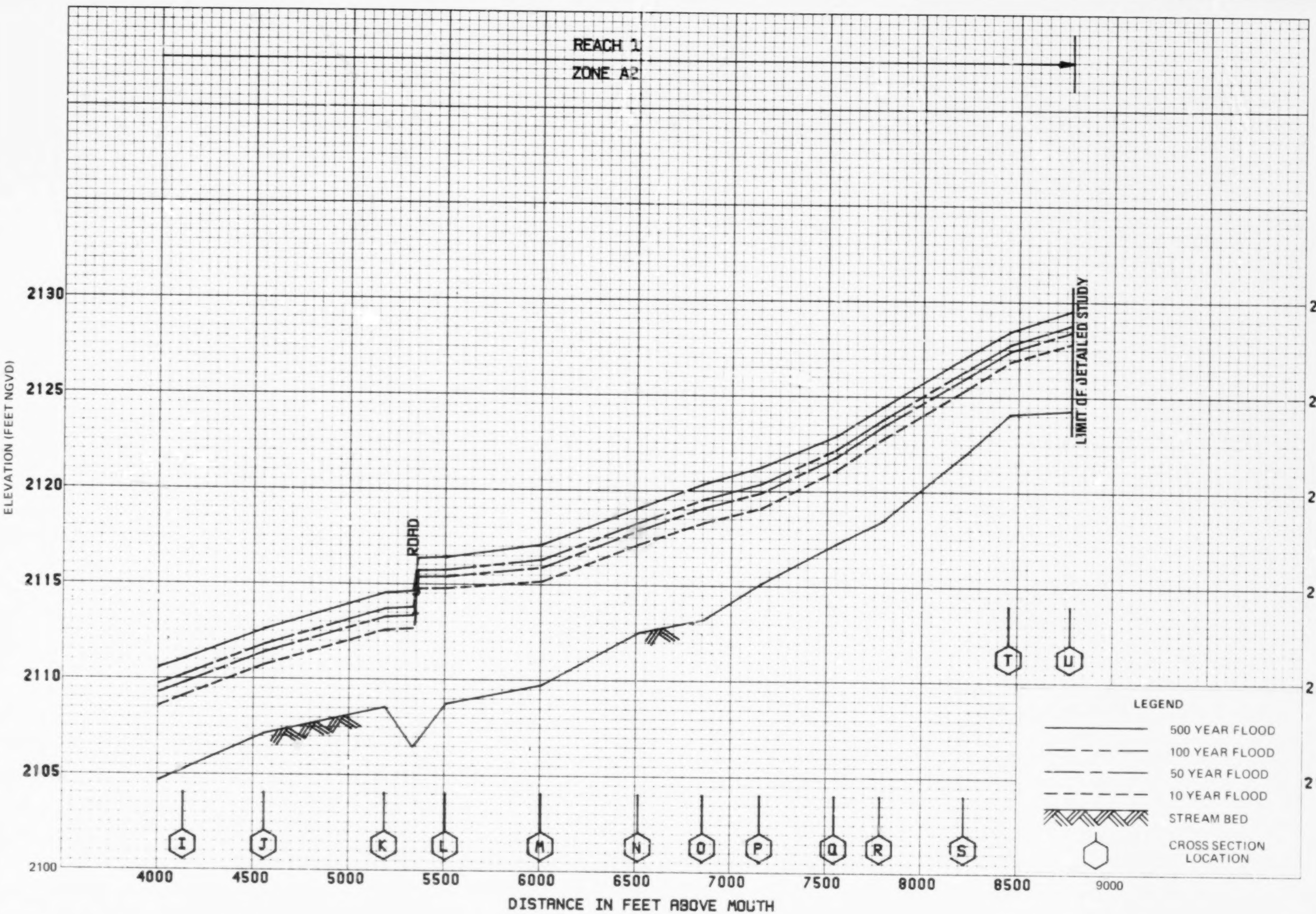
SAND CREEK - NORTH

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREA)

43P

95



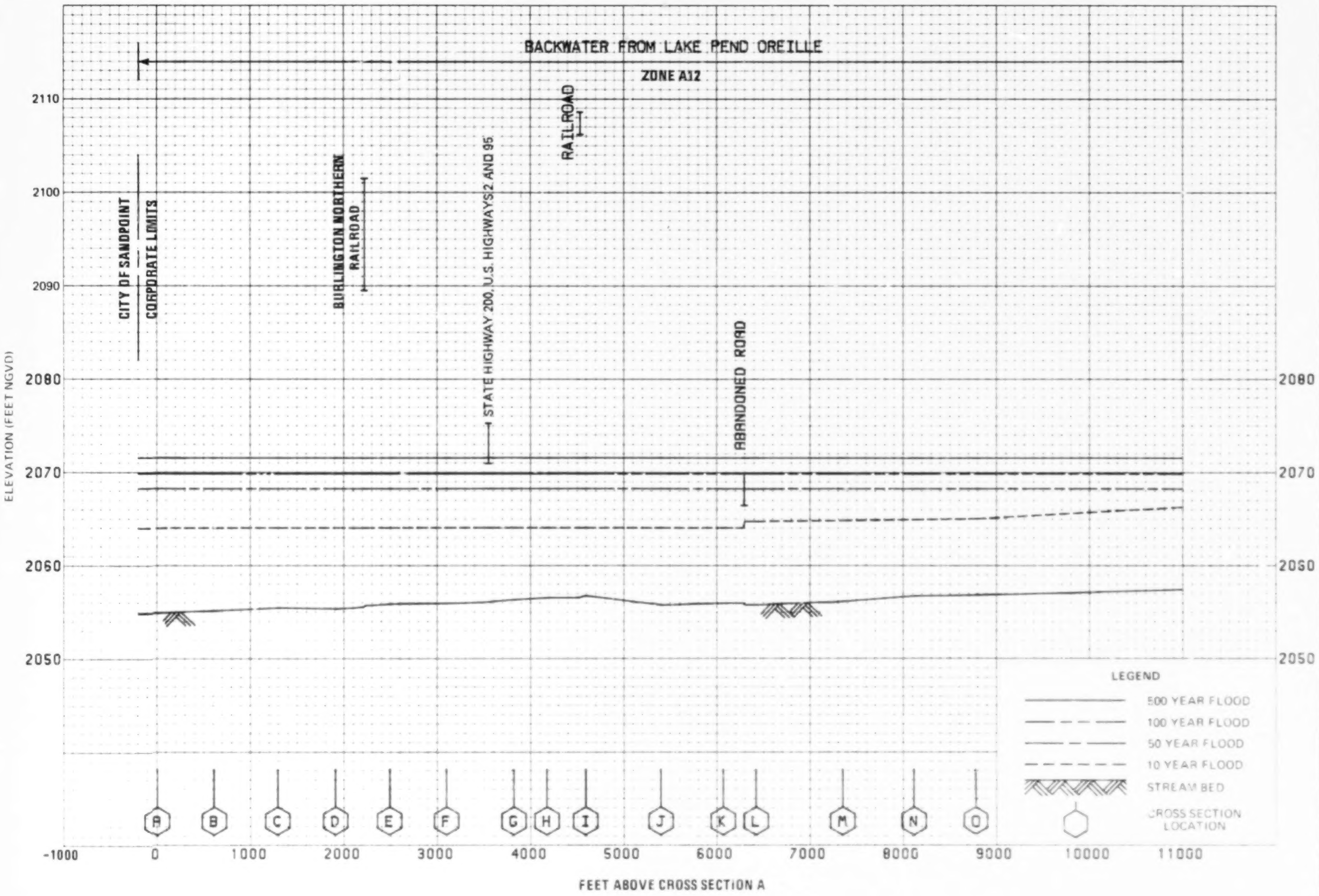
FLOOD PROFILES

SAND CREEK - NORTH

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREA)

44P

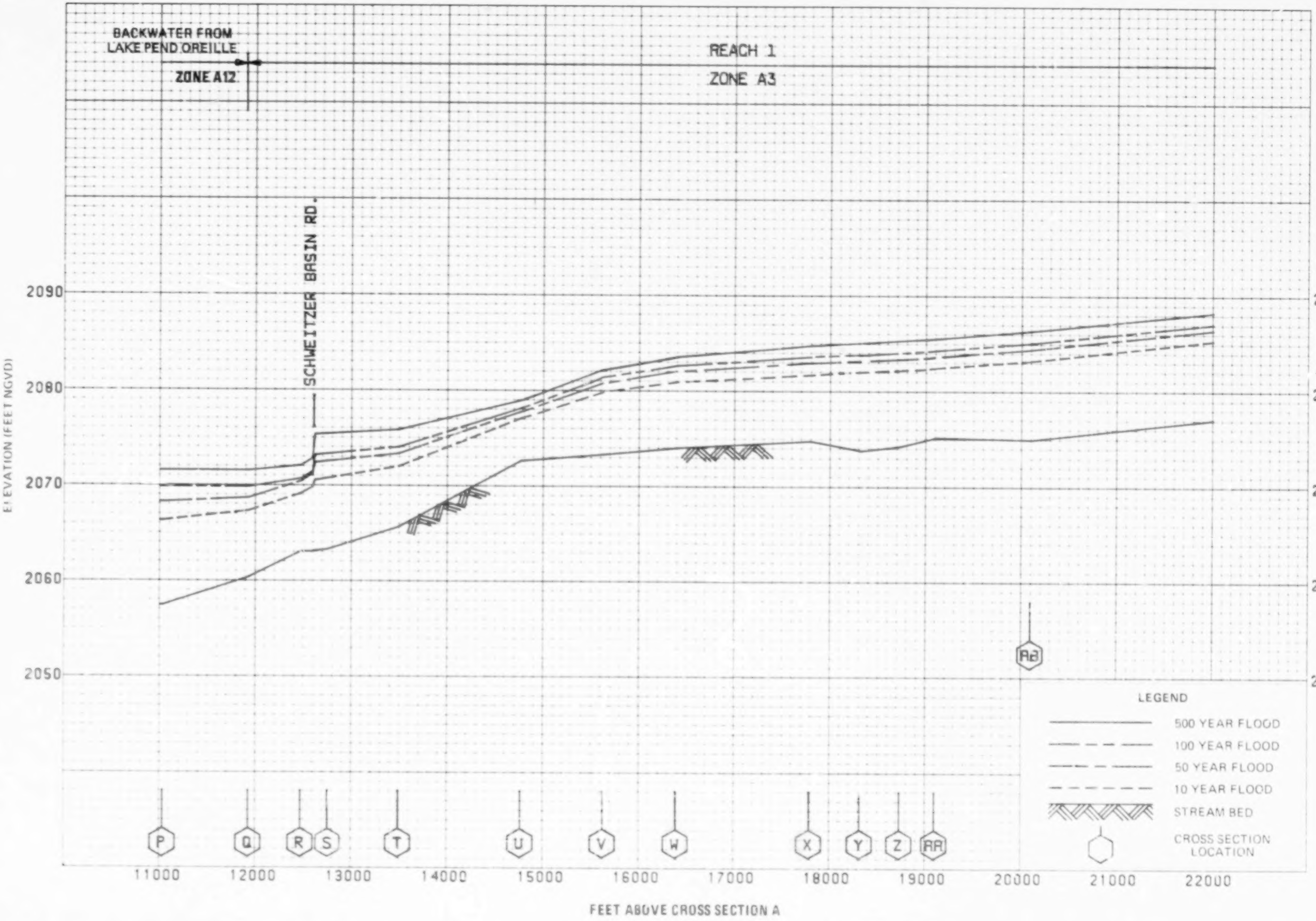


FLOOD PROFILES

SAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)



FLOOD PROFILES

SAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

46P

101

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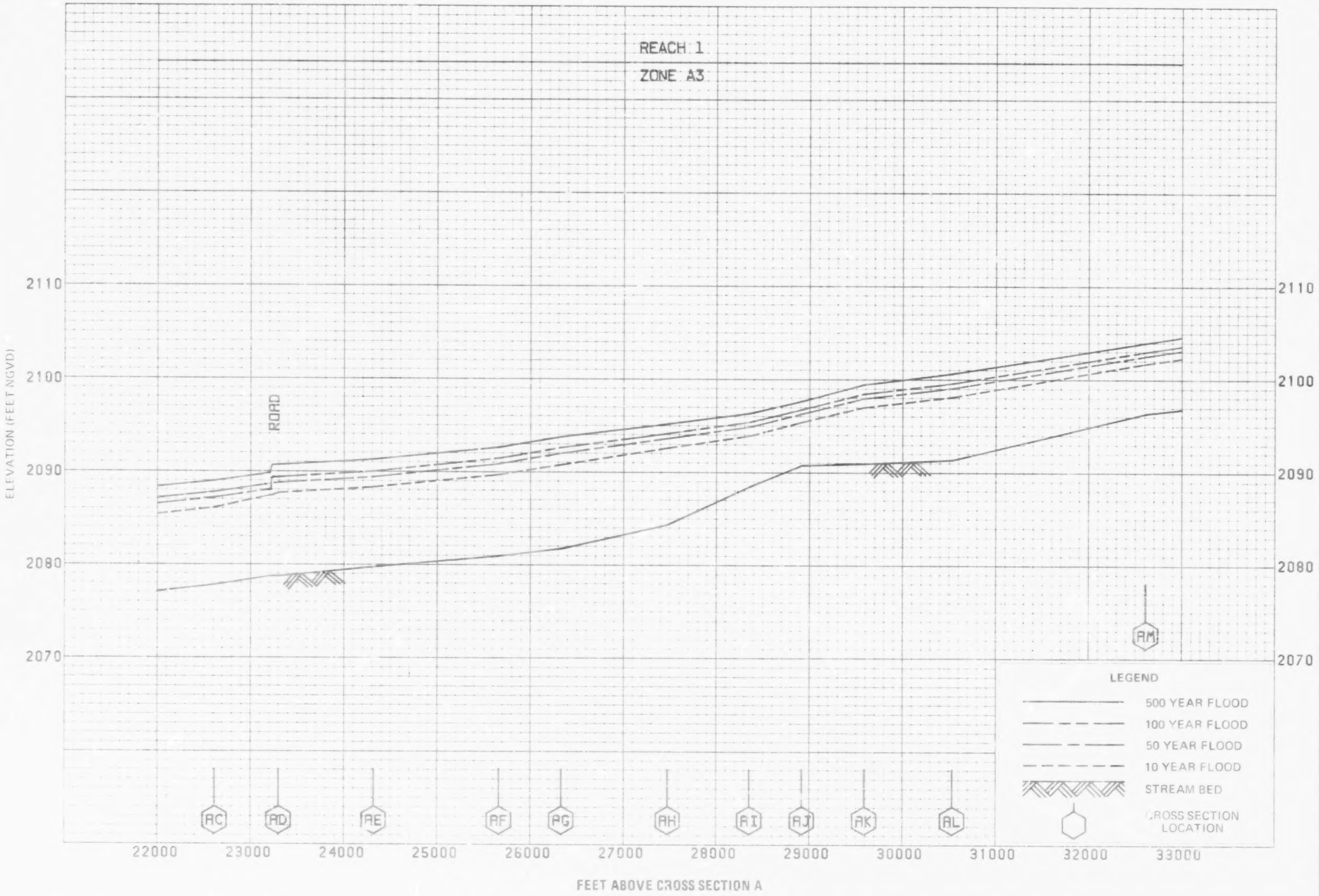

FLOOD PROFILES

SAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

102

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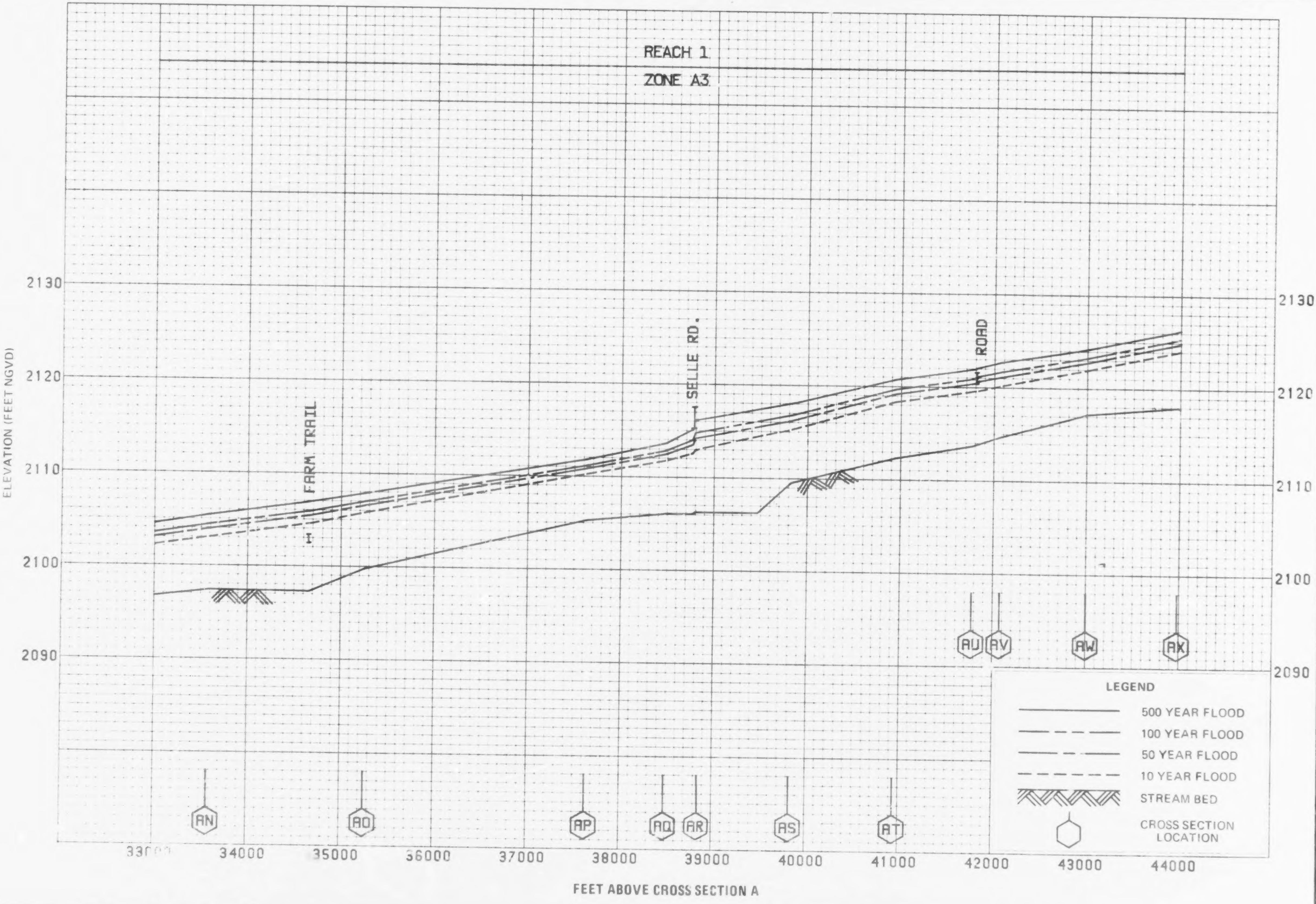


FLOOD PROFILES

SAND CREEK

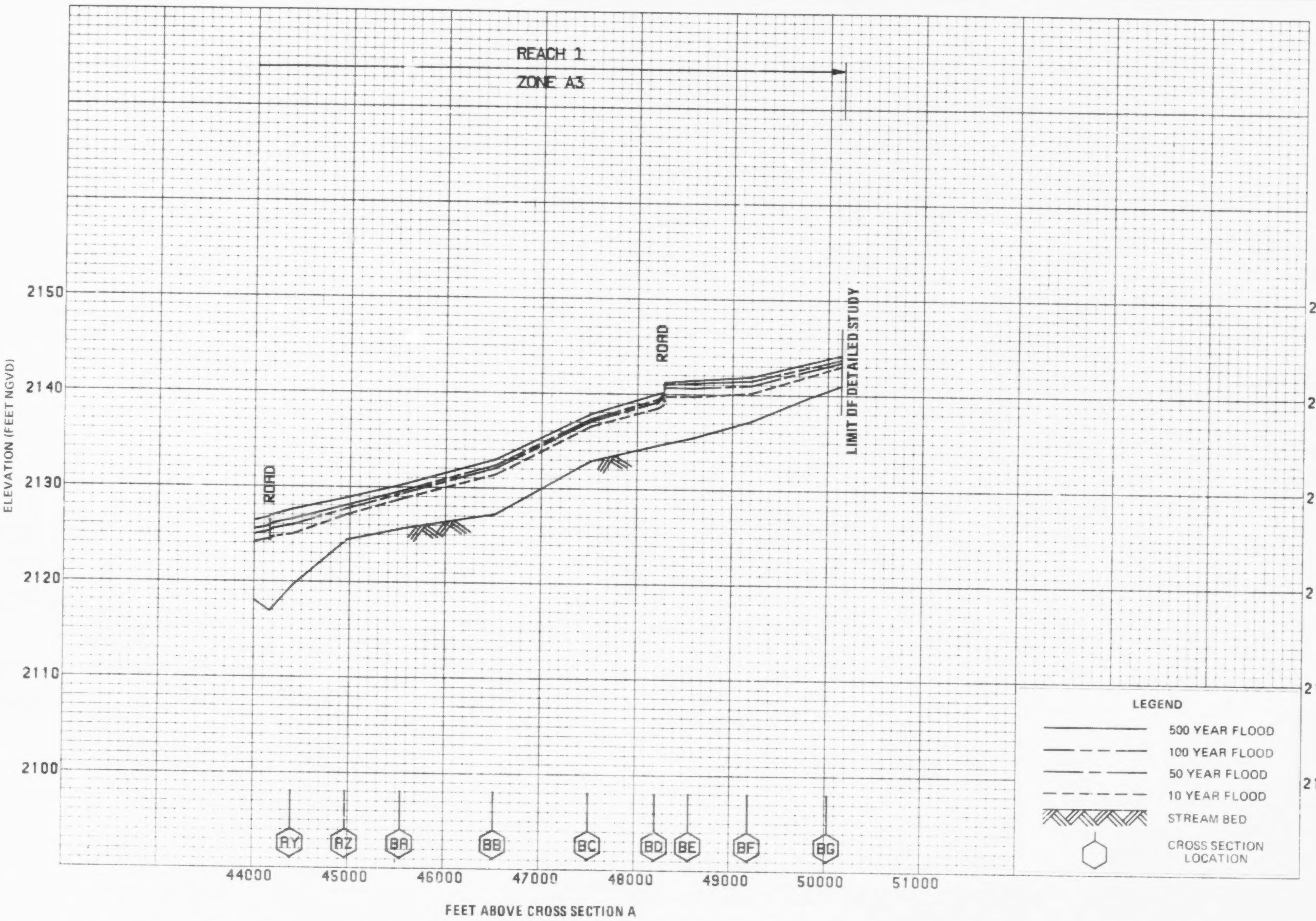
FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID

(UNINCORPORATED AREAS)

48P

10-3



FLOOD PROFILES

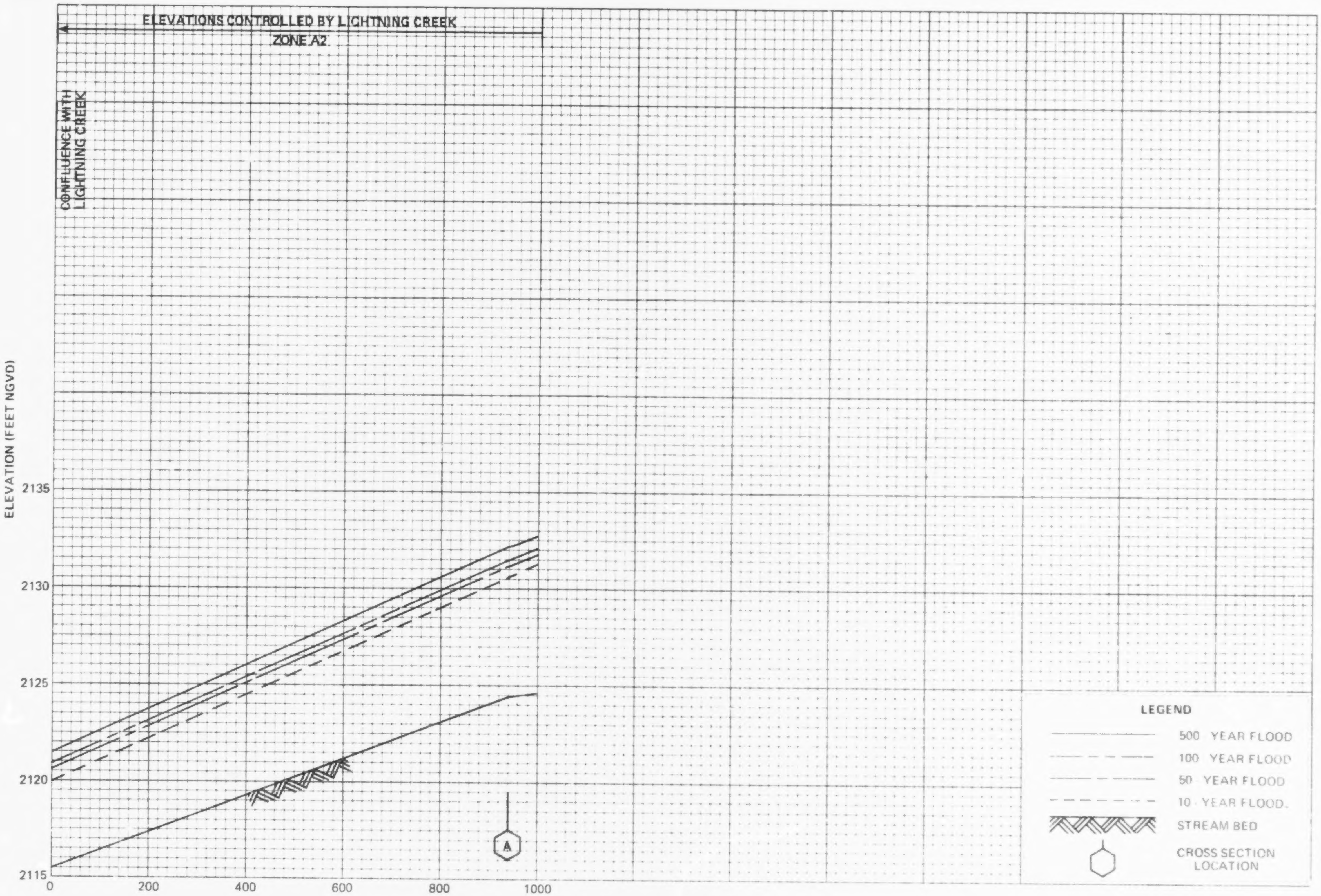
SAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

49P

104



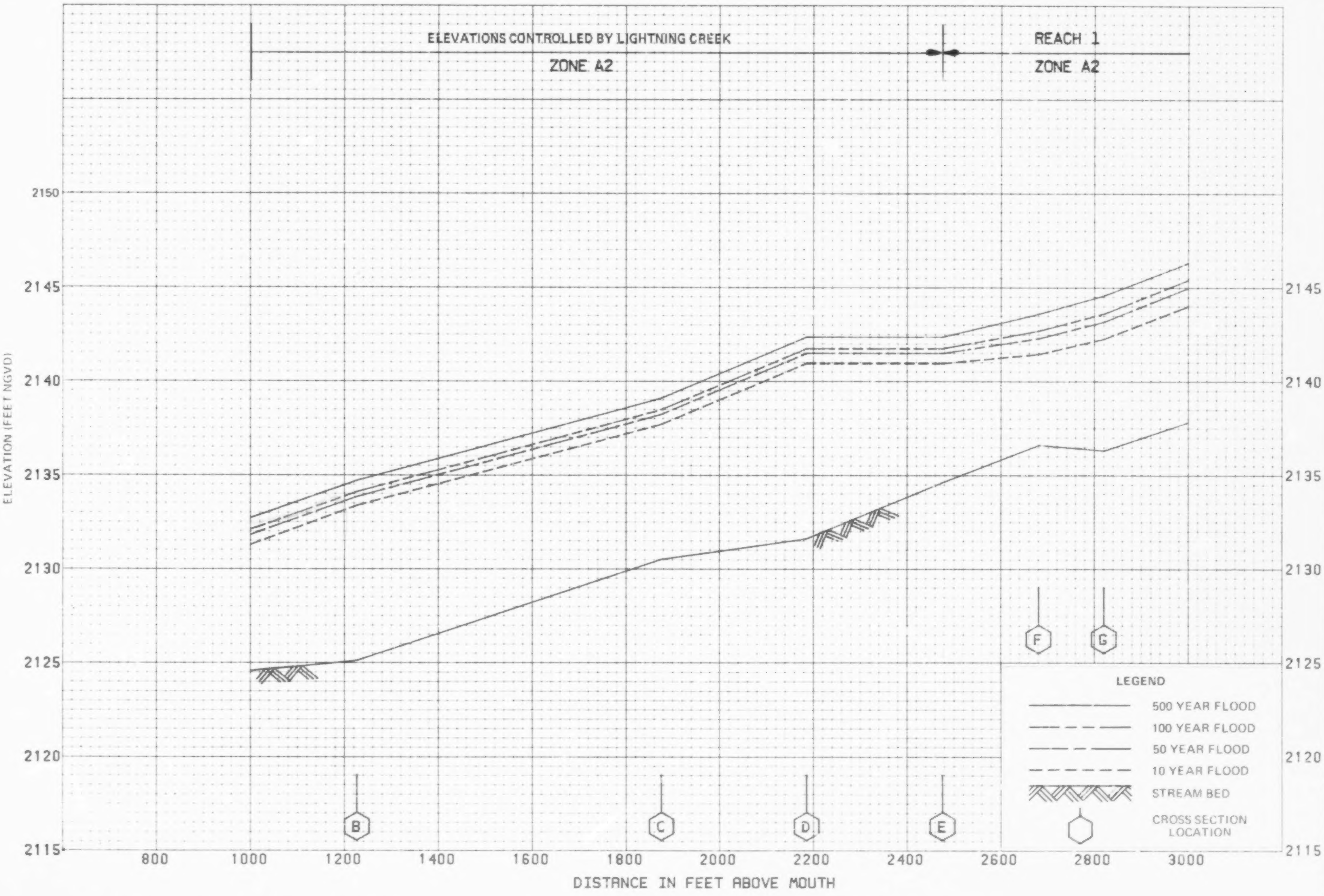
FLOOD PROFILES

SPRING CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

50P



FLOOD PROFILES

SPRING CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

51P

106

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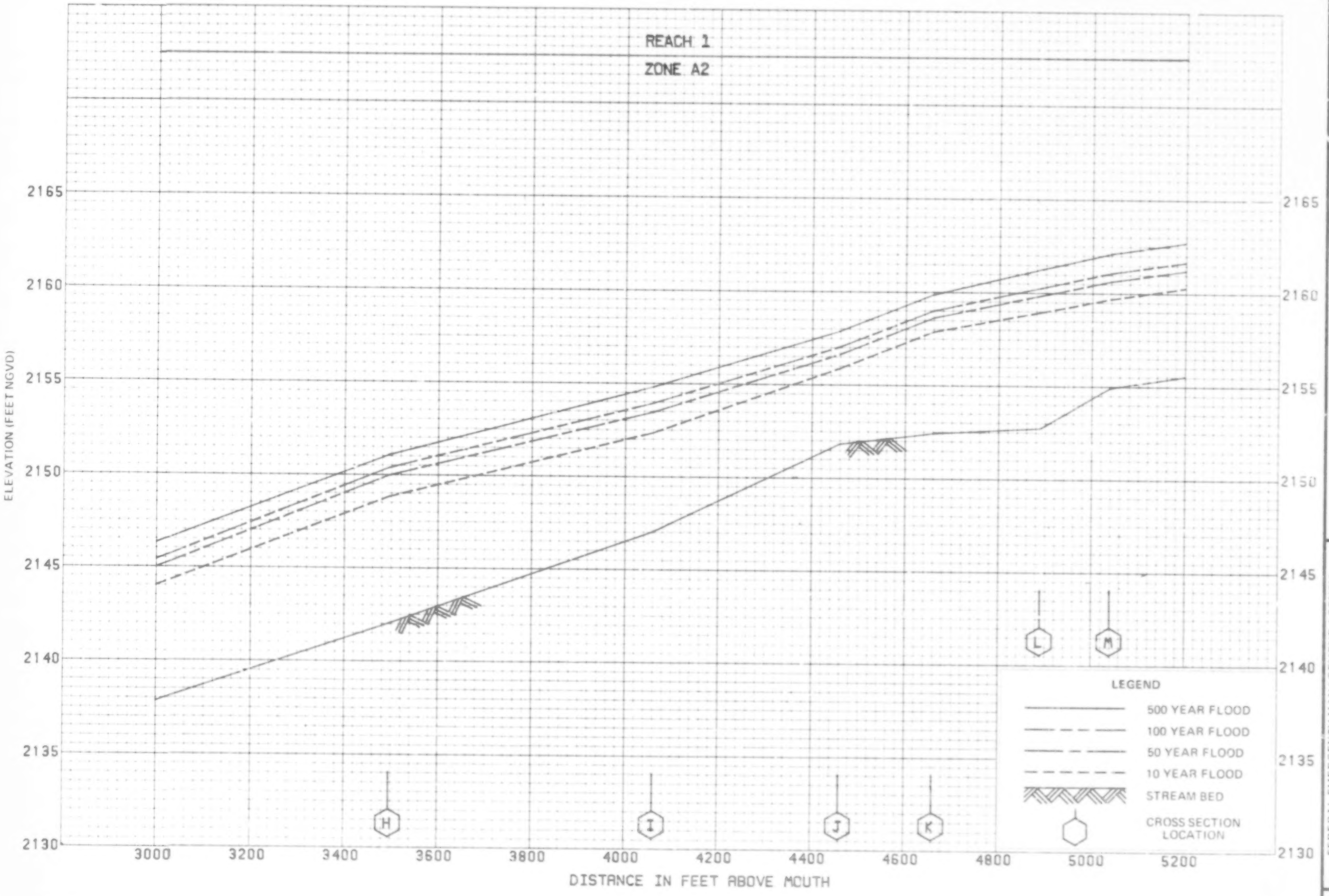


FLOOD PROFILES

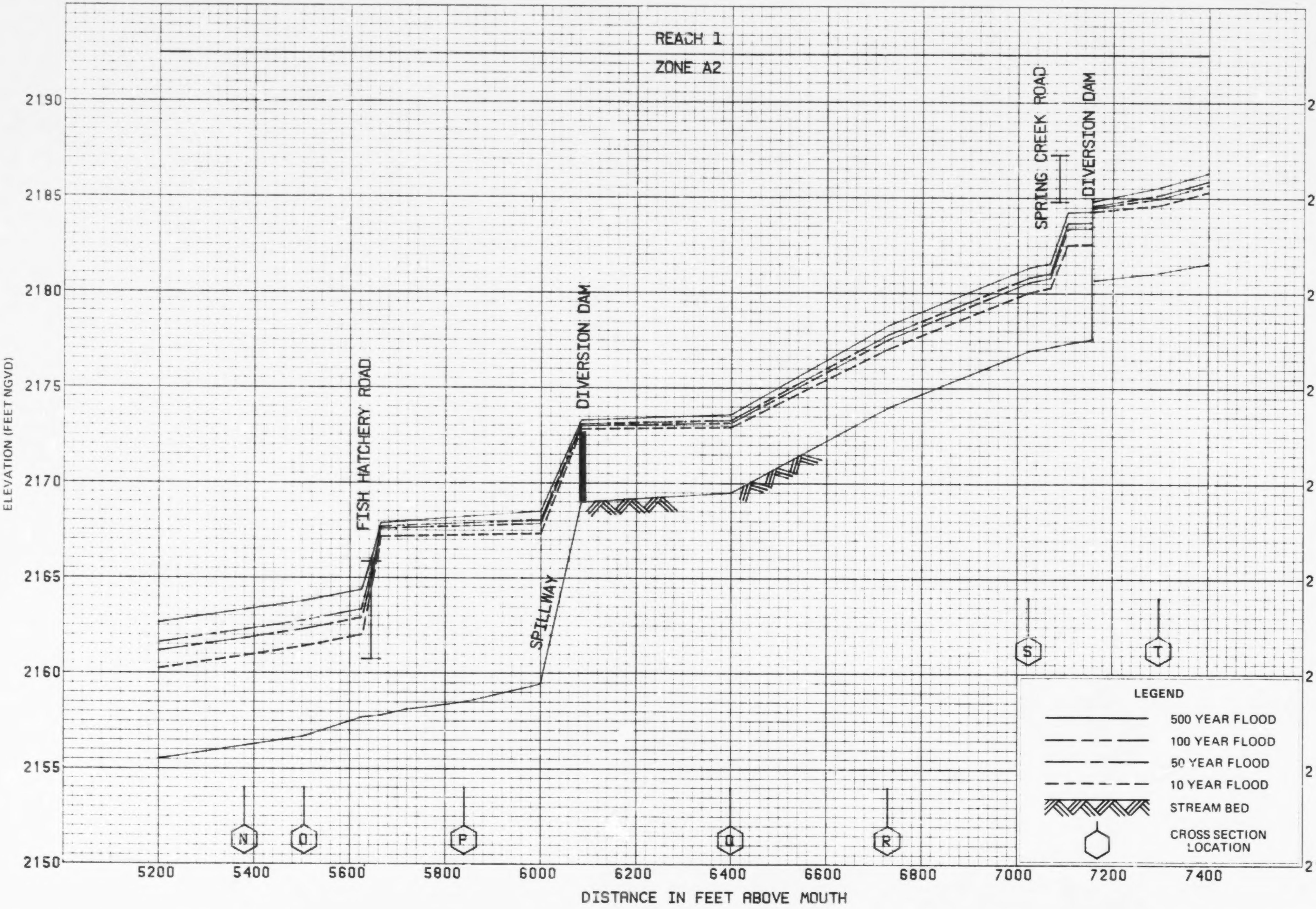
SPRING CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

52P

107



FLOOD PROFILES

SPRING CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

53P

108

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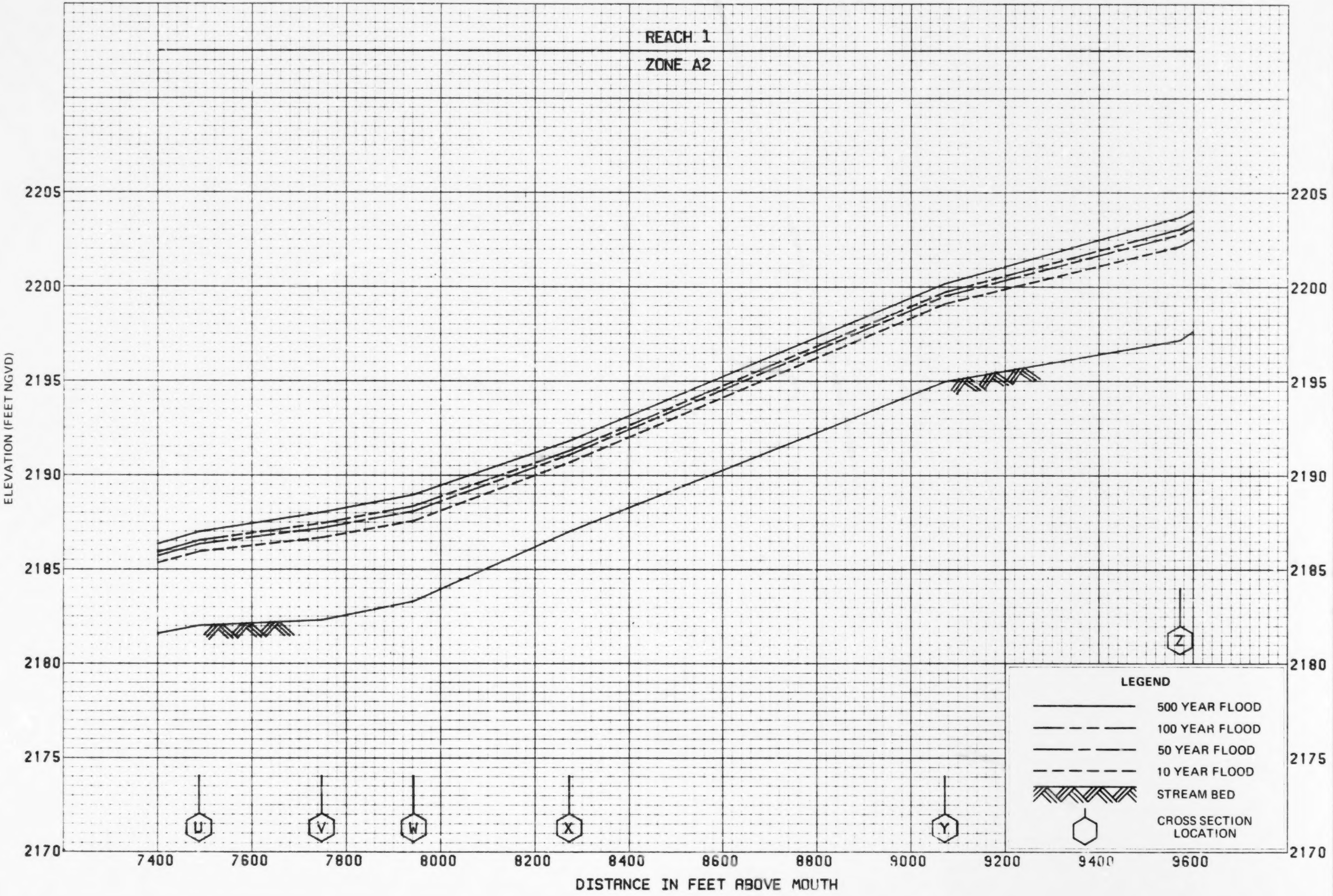

FLOOD PROFILES

SPRING CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

54P

109

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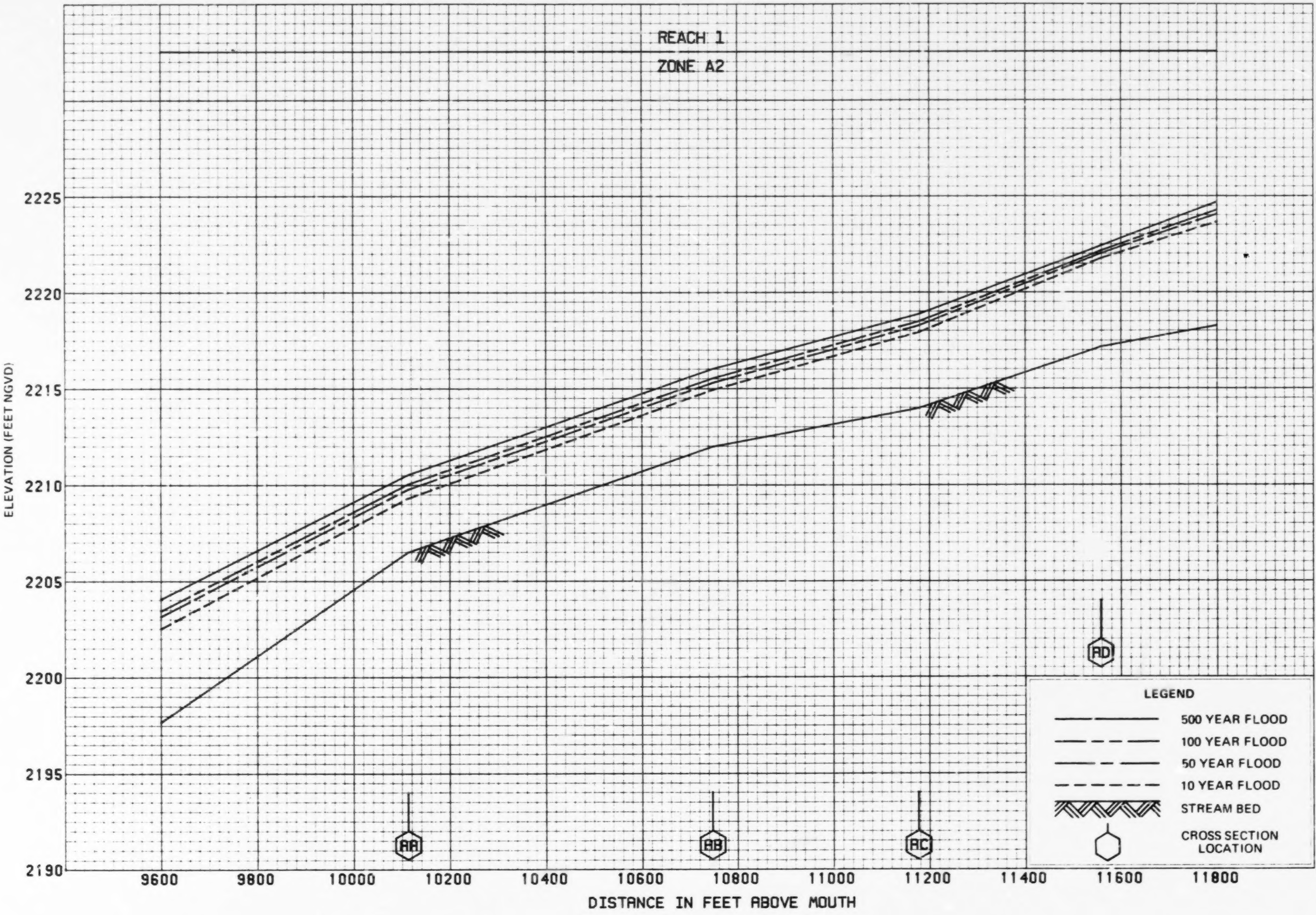


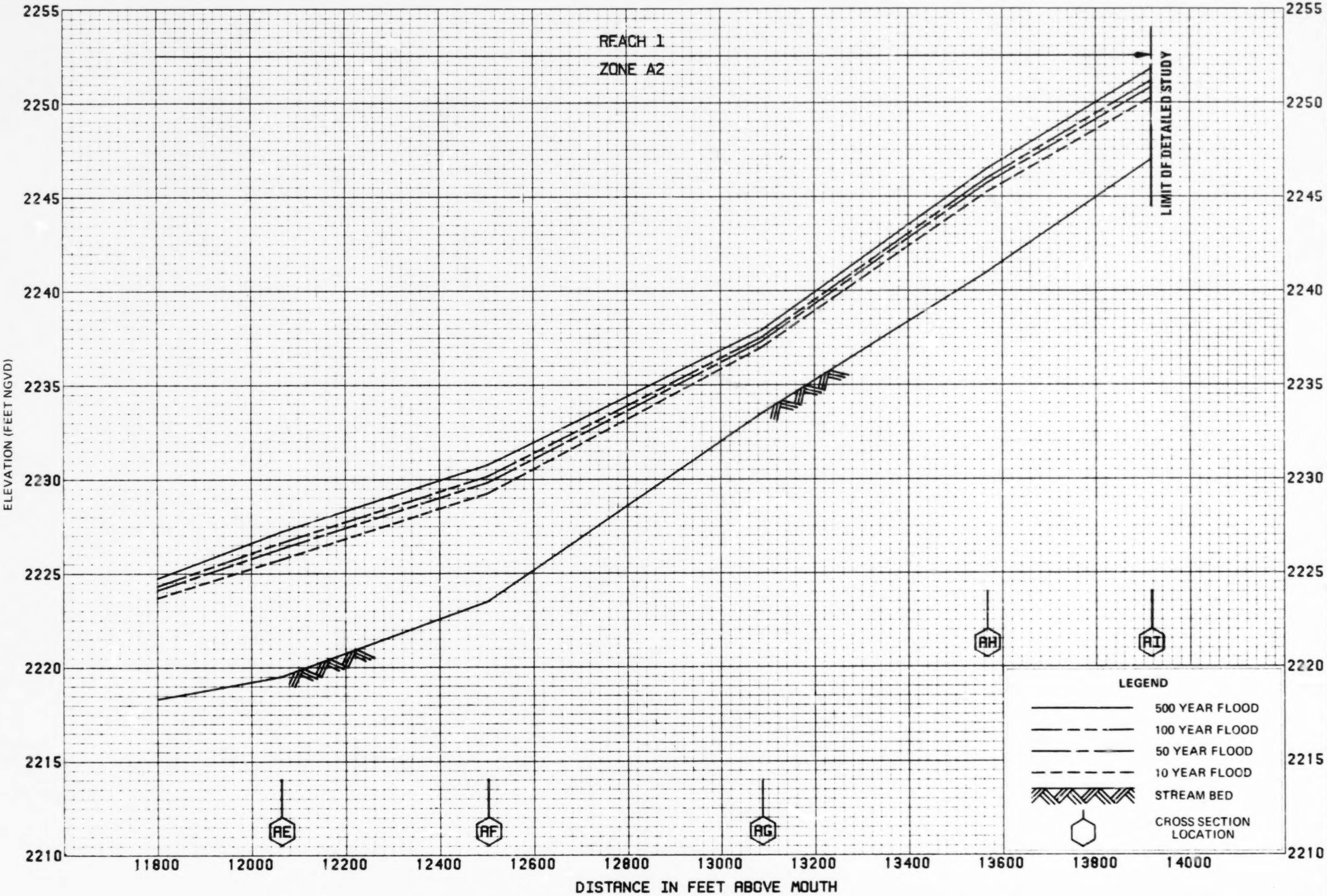
FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
(UNINCORPORATED AREAS)

FLOOD PROFILES

SPRING CREEK

55P



FLOOD PROFILES

SPRING CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BONNER COUNTY, ID
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56P

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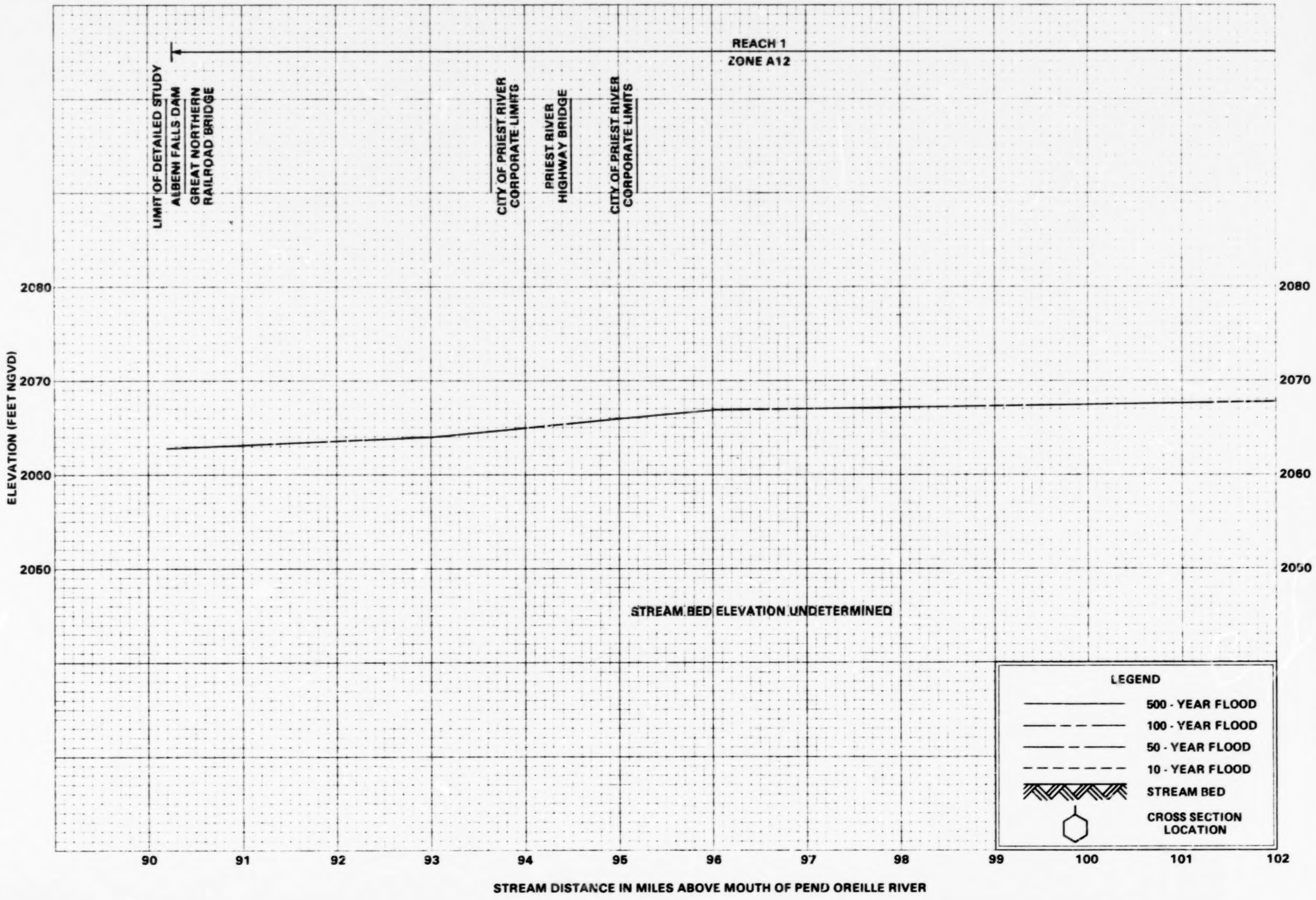

FLOOD PROFILES

PEND OREILLE RIVER

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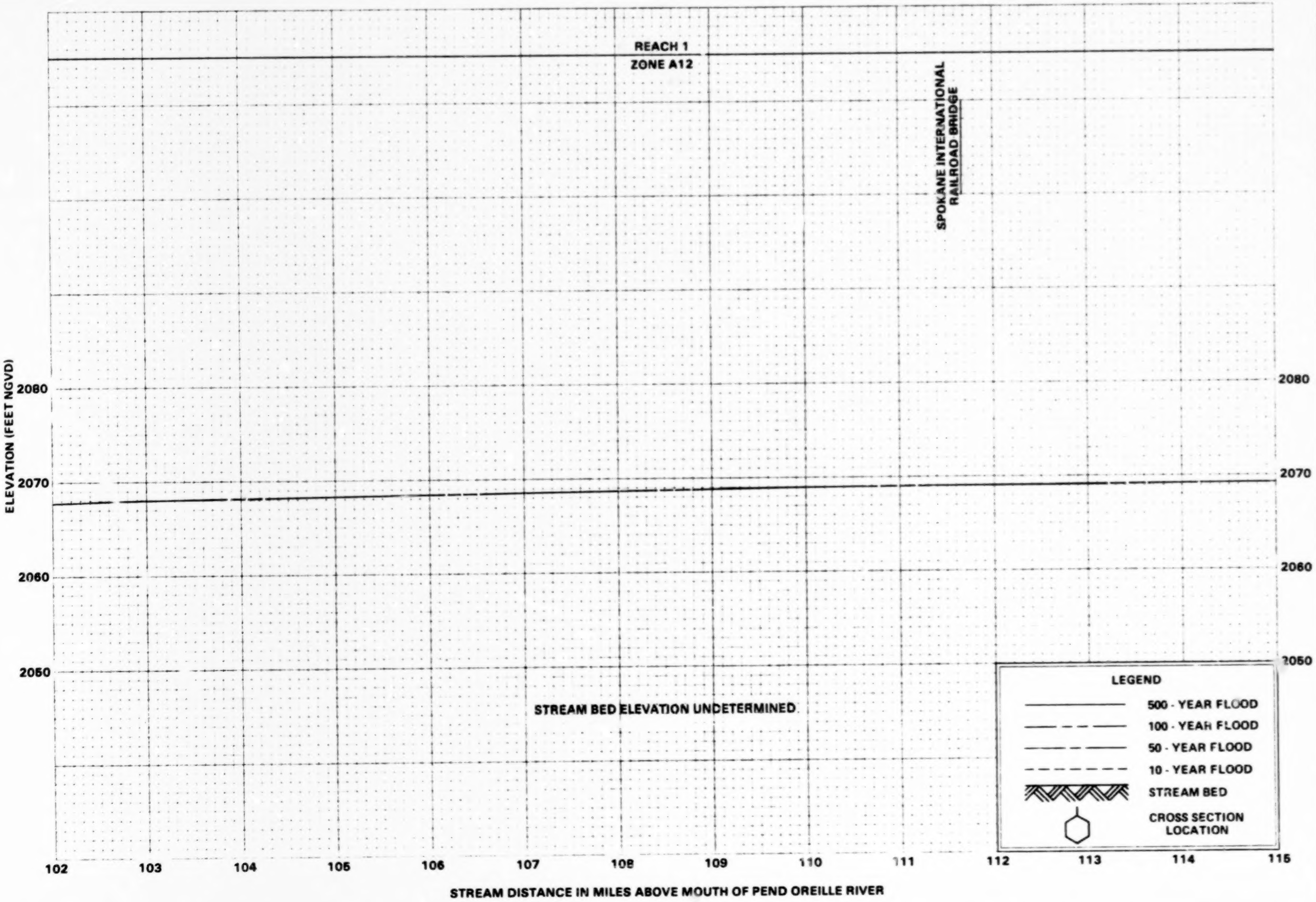

FLOOD PROFILES

PEND OREILLE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

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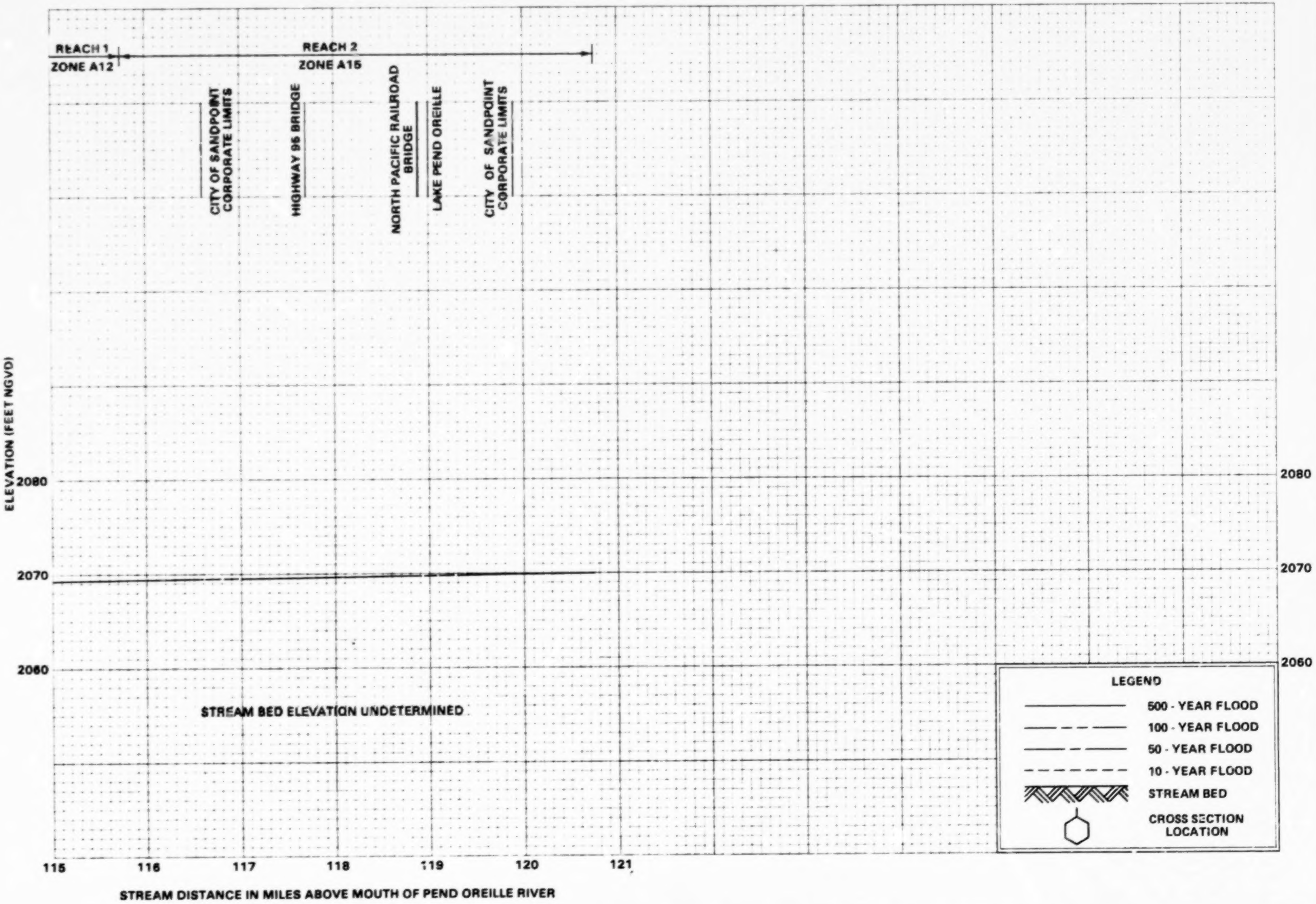
(UNINCORPORATED AREAS)

58P



FLOOD PROFILES

PEND OREILLE RIVER

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114

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